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NSSDC

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Data Catalog  
of  
Satellite Experiments

Supplement No. 2d to NSSDC 71-20

DECEMBER 1974

(NASA-TM-X-72538) DATA CATALOG OF SATELLITE  
EXPERIMENTS. SUPPLEMENT NO. 2D:  
PLANETOLOGY (NASA) 88 p HC \$4.75 CSCL 22B

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DATA CENTER

GREENBELT, MD.

## *Definitions of Discipline Categories for Announcing the Availability of Space Science Experiment Data*

. ASTRONOMY - This category includes all observations of astronomical objects, both outside and within the solar system, made at various wavelengths (i.e., gamma rays through radio waves). Observed objects outside the solar system include stars, nebulae, galaxies, and all other matter. Observed objects within the solar system include zodiacal light sources, meteoroids, asteroids, dust, micrometeorites, and planetary radio emission sources. Other planetary observations (see Planetary Atmospheres, Planetology, or Ionospheric Physics) and solar observations (see Solar Physics) are excluded. Observations of cosmic-ray particles are listed under Particles and Fields. Celestial mechanics measurements are included under Geodesy and Gravimetry.

. GEODESY AND GRAVIMETRY - This category includes experiments that measure size, shape, mass, coordinates, altitudes, or gravity fields or experiments concerned with the mapping of a body. It includes the mechanics of orbiting artificial and natural bodies.

. IONOSPHERIC PHYSICS - This category includes observations of the ionosphere, which is defined as that region of a planetary atmosphere which contains a significant number of free thermal electrons on a daily basis and which has a free electron density maximum in the vertical direction. Its upper and lower extents are roughly defined as the areas in which densities approach  $10^{-4}$  of the peak values. Included are all in situ and remotely sensed observations of ionospheric charged particles with thermal energies. This category is used for remotely sensed propagation experiments that primarily focus on the ionosphere, including very low frequency (VLF) and extremely low frequency (ELF) experiments; for other remotely sensed propagation experiments, an appropriate category, such as Particles and Fields, is used.

. METEOROLOGY - This category includes observations made in the Earth's hydrosphere and atmosphere up to the mesopause or D region.

. PARTICLES AND FIELDS - The subcategory Particles includes all in situ charged-particle measurements except those of thermal plasma in terrestrial or other planetary ionospheres (see Ionospheric Physics). It includes all neutron measurements and electromagnetic signal propagation experiments designed to measure columnar electron densities (except those in which the most significant portion of the free electrons within the column is within an ionosphere). The subcategory Fields includes all in situ measurements of electric and magnetic fields. It includes VLF and ELF experiments other than those primarily concerned with observing ionospheric properties. It excludes electromagnetic radiation (radio waves through gamma waves) propagating away from remote sources. (In such cases, either Solar Physics or Astronomy is used, as appropriate.)

. PLANETARY ATMOSPHERES - This category includes all observations of the gaseous envelope above the surface of a planet. For the Earth the lower limit for observations that belong in this category is about 65 km, the height of the mesopause or D region. (For studies below this altitude, Meteorology is used.) The upper limit is defined as the transition level of the lightest gas. This region overlaps the ionosphere for planets which have an ionosphere; however, ionospheric observations are restricted to observations related to the charge aspects of matter, while Planetary Atmospheres relates to the mass aspects of matter (e.g., composition measurements). For cases in which both atmospheric and ionospheric categories apply, both may be used.

. PLANETOLOGY - This category includes experiments for the purpose of deriving and analyzing data from the solid or liquid parts (excluding the oceans of the Earth) of any solar system body. Chemical, physical, and geologic studies of properties of gross or small surface features, materials of the surface, internal properties, magnetic properties, etc., are included. Gravitational and geodetic experiments are excluded from this category (see Geodesy and Gravimetry). When the primary purpose of the study is to measure the residual effects of some external phenomena (such as meteorite or cosmic-ray impacts), the external phenomena should determine the choice of category. If necessary, the experiment may be assigned to more than one category.

. SOLAR PHYSICS - This category includes all solar observations, regardless of the wavelength being observed. The source region considered here extends outward from the Sun to include that area observed with solar coronagraphs (nominally to 10 solar radii). All in situ measurements of electric or magnetic fields and of particles for which the source is believed to be the Sun are considered to fall in the domain of Particles and Fields.

NATIONAL SPACE SCIENCE DATA CENTER  
DATA CATALOG OF SATELLITE EXPERIMENTS

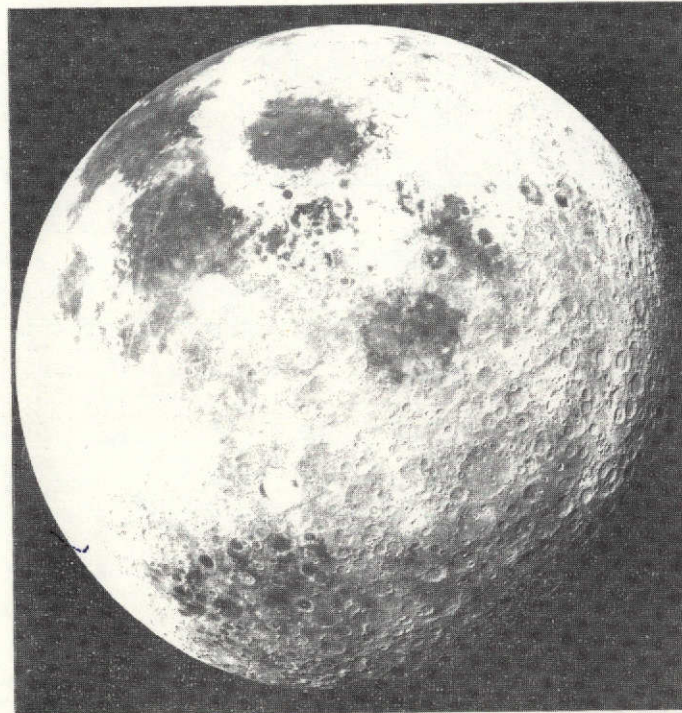
*PLANETOLOGY*

SUPPLEMENT NO. 2d to NSSDC 71-20

- - -

Technical Coordinator

Winifred S. Cameron



National Space Science Data Center  
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Greenbelt, Maryland 20771

December 1974

## CONTENTS

	<u>Page</u>
INTRODUCTION .....	vii
Purposes and Organization .....	vii
Data Availability, Costs, and Ordering Procedures .....	viii
NSSDC Facilities and Services .....	x
Participation .....	x
Abbreviations and Acronyms .....	x
DESCRIPTION OF DATA .....	xi
General .....	xi
Identification of Spacecraft, Experiments, and	
Data Sets .....	xi
Spacecraft, Experiment, and Data Set Descriptions* .....	xii
Apollo 11 LM/EASEP (69-059C) .....	1
Alley - Laser Ranging Retroreflector	
(69-059C-04) .....	1
Shoemaker - Lunar Field Geology	
(69-059C-01) .....	2
Apollo 12 LM/ALSEP (69-099C) .....	4
Latham - Passive Seismic (69-099C-03) .....	4
Shoemaker - Lunar Field Geology (69-099C-01) .....	7
Sonett - Lunar Surface Magnetometer	
(69-099C-04) .....	9
Apollo 14 CSM (71-008A) .....	10
Howard - Down-Link Bistatic Radar Observations	
(71-008A-04) .....	11
Apollo 14 LM/ALSEP (71-008C) .....	13
Fallor - Laser Ranging Retroreflector	
(71-008C-09) .....	13
Kovach - Active Seismic (71-008C-05) .....	15
Latham - Passive Seismic (71-008C-04) .....	16
Mitchell - Soil Mechanics (71-008C-02) .....	19
Swann - Lunar Field Geology (71-008C-01) .....	20

\*Because of the number of entries in this section, only the spacecraft and experiments are listed here.

# CONTENTS (continued)

	<u>Page</u>
Apollo 15 CSM (71-063A) .....	21
Doyle - Handheld Photography (71-063A-01) .....	22
Doyle - Panoramic Photography (71-063A-02) .....	24
Doyle - Metric Photography (71-063A-03) .....	25
Howard - Bistatic Radar (71-063A-14) .....	27
Apollo 15 LM/ALSEP (71-063C) .....	29
Failer - Laser Ranging Retroreflector (71-063C-08) .....	30
Latham - Passive Seismic (71-063C-01) .....	31
Swann - Lunar Field Geology (71-063C-10) .....	34
Apollo 16 CSM (72-031A) .....	36
Doyle - Handheld Photography (72-031A-01) .....	36
Doyle - Panoramic Photography (72-031A-02) .....	38
Doyle - Metric Photography (72-031A-03) .....	40
Howard - Bistatic Radar (72-031A-12) .....	41
Apollo 16 LM/ALSEP (72-031C) .....	44
Kovach - Active Seismic (72-031C-02) .....	44
Latham - Passive Seismic (72-031C-01) .....	45
Muehlberger - Lunar Field Geology (72-031C-05) ...	48
Apollo 17 CSM (72-096A) .....	50
Doyle - Handheld Photography (72-096A-05) .....	50
Doyle - Panoramic Photography (72-096A-06) .....	52
Doyle - Metric Photography (72-096A-07) .....	54
Apollo 17 LM/ALSEP (72-096C) .....	56
Langseth - Heat Flow (72-096C-01) .....	56
Swann - Lunar Field Geology (72-096C-02) .....	57
Lunar Orbiter 1 (66-073A) .....	59
Kosofsky - Lunar Photographic Studies (66-073A-01) .....	59
Lunar Orbiter 2 (66-100A) .....	60
Kosofsky - Lunar Photographic Studies (66-100A-01) .....	61

# CONTENTS (continued)

	<u>Page</u>
Lunar Orbiter 3 (67-008A) .....	62
Kosofsky - Lunar Photographic Studies	
(67-008A-01) .....	63
Lunar Orbiter 4 (67-041A) .....	64
Kosofsky - Lunar Photographic Studies	
(67-041A-01) .....	64
Lunar Orbiter 5 (67-075A) .....	65
Kosofsky - Lunar Photographic Studies	
(67-075A-01) .....	66
Mariner 9 (71-051A) .....	67
Masursky - Television Photography	
(71-051A-04) .....	67

## INTRODUCTION

### Purposes and Organization

The purposes of the Data Catalog of Satellite Experiments are to announce the availability of experimental space science data, to describe these data, and to inform potential users of the policies and procedures associated with the data dissemination services provided by the National Space Science Data Center (NSSDC). The space science experiment data available as of June 1973 are described in the Data Catalog of Satellite Experiments, December 1971 (NSSDC 71-20), and its supplement, October 1973 (NSSDC 73-11).

Beginning with this issue, a new concept for announcing the availability of data at NSSDC has been adopted. This concept is based upon the Selective Dissemination of Information (SDI) principle. Under the NSSDC SDI system, the types of satellite experiment data acquired have been divided into the following eight major discipline categories: Astronomy, Geodesy and Gravimetry, Ionospheric Physics, Meteorology, Particles and Fields, Planetary Atmospheres, Planetology, and Solar Physics. The Data Center definitions of these categories are provided on the inside front cover. (It should be noted that these category definitions reflect the best judgment of the NSSDC staff and are not intended as definitive descriptions of discipline boundaries.) The current issue of the catalog has been published in four volumes. One volume covers the categories of Astronomy and Solar Physics. Another combines the categories of Ionospheric Physics, Meteorology, and Planetary Atmospheres. Particles and Fields constitutes one separate volume, and Planetology, another separate volume. The few experiments which fall under more than one category have been included in each of the relevant discipline volumes. Generally, each volume describes only those data sets and associated spacecraft and experiments not included in the 1971 or 1973 issues of the catalog and are currently suitable for announcement. Additionally, the volumes may contain descriptions of data sets previously announced for which sufficient quantities of new data have been acquired to merit their inclusion.

Cumulative volumes for the discipline categories will be prepared in spring 1975. An index volume will also be prepared at that time that will be sent to all participants in the SDI system. This volume will contain indexes by Spacecraft Name, Investigator Name, Original Experiment Institution and/or Current Experiment Institution, and Phenomenon Measured for all data included in any of the discipline volumes. Also included will be descriptions of spacecraft from which NSSDC has acquired data, as well as descriptions of ephemeris or other special spacecraft-related data sets appropriate for announcement.

Each index will refer to the discipline volumes in which the description of the experiment or its associated data set can be found. The index volume alone may satisfy the needs of many users; in addition, subject volumes in the various categories will be sent automatically to users who have expressed an interest in any category in that volume. Subject volumes will be available to others on special request.

### Data Availability, Costs, and Ordering Procedures

The purpose of the National Space Science Data Center (NSSDC) is to provide data and information from space science experiments in support of additional studies beyond those performed by the principal investigators. Therefore, NSSDC will provide data and information upon request to any individual or organization resident in the United States. In addition, the same services are available to scientists outside the United States through the World Data Center A for Rockets and Satellites (WDC-A-R&S). Normally, a charge is made for the requested data to cover the cost of reproduction and the processing of the request. The requester will be notified of the cost, and payment must be received prior to processing the request. The Director of NSSDC may waive, as resources permit, the charge for modest amounts of data when they are to be used for scientific studies, or for specific educational purposes, and when they are requested by an individual affiliated with:

1. NASA installations, NASA contractors, or NASA grantees
2. Other U.S. Government agencies, their contractors, or their grantees
3. Universities and colleges
4. State and local governments
5. Nonprofit organizations

A user may obtain data in any of the following ways:

1. Letter request
2. Data Request Form (contained at the end of this document)
3. Telephone request
4. On-site visit



Anyone who wishes to obtain data for a scientific study should specify the NSSDC identification number, the common name and/or number of the satellite and the experiment, the form of data, and the time span (or location, when appropriate) of data requested. A requester should also specify why the data are needed, the subject of his work, the name of the organization with which he is affiliated, and any Government contracts he may have for performing his study. Upon special request, data may be provided in a medium other than that noted in the heading of the data set descriptions. For example, computer printout or microfilmed listings could be produced from magnetic tape data sets. Enlarged paper prints are available from data sets on photographic film and microfilm. The Data Center will provide the requester with an estimate of the response time and cost that will be incurred for such requests, if appropriate.

When requesting data on magnetic tape, the user should specify whether he will supply new tapes prior to the processing, return the original NSSDC tapes after the data have been copied, or pay for new tapes.

The Data Center's official address for requests is:

National Space Science Data Center  
Code 601.4  
Goddard Space Flight Center  
Greenbelt, Maryland 20771

Phone: 301 982-6695

Users who reside outside the U.S. should direct requests for data to:

World Data Center A for Rockets and Satellites  
Code 601  
Goddard Space Flight Center  
Greenbelt, Maryland 20771 U.S.A.

Phone: 301 982-6695

Since WDC-A-R&S also maintains listings of rocket experiments, requests for information concerning rocket launchings and the experiments flown may be directed to this institution.

## NSSDC Facilities and Services

NSSDC provides facilities for reproduction of data and for on-site data use. Resident and visiting scientists are invited to study the data while at the Data Center. The Data Center staff will assist users with additional data searches and with the use of equipment. In addition to satellite and space probe data, the Data Center maintains some correlative data and information on other correlative data that may be related to a specific request. These correlative data are described in the NSSDC Handbook of Correlative Data, NSSDC 71-05, which is available from the Data Center.

In addition to its main function of providing selected data and supporting information for further analysis of space science flight experiments, the Data Center produces a wide spectrum of publications. Among these are a report on active and planned spacecraft and experiments, a report of recent sounding rocket launchings, and lunar and planetary photographic catalogs and users guides. For additional information on NSSDC and WDC-A-R&S document availability and distribution services, write to the appropriate address identified in the previous section and ask for document NSSDC/WDC-A-R&S 74-10.

## Participation

The National Space Science Data Center (NSSDC) invites members of the scientific community to contribute data from satellite experiments. NSSDC assigns a specialist in the appropriate scientific discipline for each experiment to arrange for data acquisition with the principal investigator and to help solve related problems. Acquired data are cataloged and made available to users according to established procedures. Scientists who have not been contacted by one of the subject specialists and who have analyzed or reduced data available for contribution are requested to contact NSSDC so that transfer of the data may be arranged.

The Data Center is continually striving to increase the usefulness of the data catalog by improving the data descriptions and including all pertinent information. Scientists are invited to submit their comments or recommendations to NSSDC regarding the data available, the services provided, and the contents and format of the catalog. Recipients are urged to inform potential data users of its availability. Anyone wishing to receive a copy of this publication can have his name added to this distribution list by phone or letter request.

## Abbreviations and Acronyms

The abbreviations and acronyms used in this volume are listed in the October 1973 supplement (NSSDC 73-11) to the data catalog.

## DESCRIPTION OF DATA

### General

This section was produced from the computerized NSSDC information system, which provides the Data Center with an efficient means for maintaining up-to-date descriptions of available data and for announcing the acquisition of new data. For each data set\* description contained in the information system, descriptions of the experiment and spacecraft from which the data originated are also included as background information. This section is organized by spacecraft common name and within that by the last name of the principal investigator associated with each experiment on that spacecraft. Data set descriptions follow the experiments to which they pertain and are ordered by NSSDC ID code which appears in the upper right-hand corner of the description.

### Identification of Spacecraft, Experiments, and Data Sets

In the NSSDC information system, each spacecraft, experiment, and data set is assigned an identification number, the NSSDC ID No., that is based on the launch sequence of the spacecraft. Subsequent to 1962, the NSSDC ID No. for a spacecraft (e.g., 65-042A for Explorer 28) corresponds to the COSPAR (Committee on Space Research) international designation. The Data Center has provided corresponding numbers for satellites that were launched during the years 1957 to 1962. (For example, Explorer 1, which carries COSPAR designation 1958 Alpha 1, was the first spacecraft launched in 1958; therefore, it has been assigned NSSDC ID No. 58-001A.) The experiment and data set ID numbers are based on the spacecraft number. For example, the experiments carried aboard spacecraft 67-031A (ATS 2) are numbered 67-031A-01, 67-031A-02, etc. Data sets derived from experiment 67-031A-01 are designated 67-031A-01A, 67-031A-01B, etc.

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\*A data set is defined as (1) a body of data that is the result of the reduction or analysis of data from a given experiment or (2) certain supporting information (catalogs, ephemeris, etc.) that is uniquely related to a given experiment or spacecraft. The content, characteristics, form, format, or organization of this body of data is different from that of any other body of data or supporting information associated with the given experiment or spacecraft.

## Spacecraft, Experiment, and Data Set Descriptions

Each entry in this section is composed of two parts -- a heading and a brief description. Each type of entry (i.e., spacecraft, experiment, and data set) contains its own heading. The headings list generic characteristics of satellites, experiments, and data sets. Details on the contents of the three kinds of entries are described in the following paragraphs.

### Contents of Spacecraft Entries

The heading for each spacecraft description contains the following information about the spacecraft: launch date, spacecraft weight in orbit, spacecraft status of operation, and, for inoperable or operationally off spacecraft, the date last spacecraft data were recorded or, if available, the date last usable spacecraft data were recorded. Orbiting spacecraft also have the following orbital parameters included in the heading: epoch date, orbit type, orbit period, apoapsis and periapsis (distance from the surface of the reference body to the furthest and nearest orbit points, respectively), and inclination (the angle between the satellite orbital plane and the equatorial plane of the primary gravitational body). For satellites with heliocentric orbits, the ecliptic plane is used in lieu of the equatorial plane.

Each spacecraft brief description contains a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. Information about the operational performance and status of the spacecraft during a given period of time also is included and is frequently updated. In some cases the performance and status information reflected in the description may disagree with information found in the heading under "Status of Operation." When there are disagreements, consider the information in the heading as more up to date.

### Contents of Experiment Entries

Each experiment entry heading lists the name of the original experiment institution and the name and address of the principal investigator for the experiment. The names and addresses of other investigators associated with the experiment are also listed. The status of operation of the experiment is then listed as "normal," "partial," "operational off," or "inoperable." For inoperable or operationally off experiments, the date last experiment data were recorded or, if available, the date last usable experiment data were recorded, is also presented. In addition, if the experiment is functioning in other than a normal mode, the brief description explains the circumstances of, and periods affected by, the change.

The experiment brief description contains a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data. Information about the operational performance and status of the experiment during a given period of time also is included and is frequently updated. In some cases the performance and status information reflected in the description may disagree with information found in the heading under "Status of Operation." When there are disagreements, consider the information in the heading as more up to date.

#### Contents of Data Set Entries

Each data set entry contains three elements in the heading: the time period covered by the data, the quantity of data and medium on which the data are stored, and an indicator describing the availability of the data. The time period covered is annotated with one of two additional comments: (1) "as verified by NSSDC" - identifying that portion of the data set for which the period of data coverage has been verified, and (2) "as reported by the experimenter" - identifying the period of coverage provided by the experimenter, regardless of the amount held or verified by NSSDC. Several indicators are used to describe the status of data availability to requesters:

- . Data at NSSDC Ready for Distribution - designates a data set for which cataloging, verification, and documentation are sufficient to provide a comprehensible set of data to satisfy requests.
- . Data in Published Reports - indicates either that all or a significant portion of the data are contained in a published report or journal, or that the only accessible source of any reduced data from an experiment is the published document. The publications cited in the brief descriptions for spacecraft, experiment, or data set entries normally are available through scientific libraries or document distribution centers. NSSDC provides copies of publications only if they cannot be obtained through such libraries or centers.
- . Data at NSSDC - identifies data sets for which documentation and verification activities are in process. These data are usually sufficiently documented and verified to satisfy routine requests.

- . Data at NSSDC Processing Deferred - indicates that the verifying, documenting, or cataloging of the data set is not complete, and that no additional work will be performed unless specifically requested. NSSDC may be able to supply the data from such a data set in a suitable form, depending upon the completeness of the processing and documentation and the particular requirements of the user. The completeness of the data set is indicated in its brief description.
- . Data Available from Experimenter - is used for data sets that NSSDC does not plan to acquire, and that the experimenter is willing to make available to other scientists, usually in limited amount. These data sets are not feasible for storing at NSSDC, either because they are large in volume or because they require special equipment to process. Requests for data sets carrying this indicator should be addressed directly to the experimenter. The experimenter's name and address and the expected date that the data will be ready for processing are given in the brief description of such a data set.
- . Data at Another Center - is used for data sets stored and distributed by any other data center. Requests for data sets with this indicator should be made directly to the organization identified in the brief description.
- . Data at Another Center that NSSDC can Process - denotes a data set held by another data center but to which NSSDC has access for limited processing. Requests for this type of data set should be submitted to NSSDC.

For information on the procedures for ordering the data described herein, please refer to page viii in the Introduction.

NATIONAL SPACE SCIENCE DATA CENTER  
DATA CATALOG OF SATELLITE EXPERIMENTS  
PLANETOLOGY

SUPPLEMENT NO. 20 TO NSSDC 71-20

\*\*\*\*\*APOLLO 11 LM/EASEP\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 11 LM/EASEP NSSDC ID 69-059C  
ALTERNATE NAMES- 04041, APOLLO 11 LM, LUNAR MODULE

LAUNCH DATE- 07/16/69 SPACECRAFT WEIGHT IN ORBIT- 4240. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

SPACECRAFT BRIEF DESCRIPTION

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING, WHEN THE ASCENT STAGE FUNCTIONED AS A SINGLE SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). INCLUDED IN THE DESCENT STAGE WERE THE EARLY APOLLO SCIENTIFIC EXPERIMENT PACKAGE (EASEP) EXPERIMENTS, WHICH WERE SELF CONTAINED. ALSO CARRIED ON THE LM WERE THE LUNAR SURFACE SOLAR WIND COMPOSITION, THE SOIL MECHANICS, AND THE SAMPLE COLLECTION EXPERIMENTS. THE EASEP EXPERIMENTS INCLUDED THE PASSIVE SEISMOGRAPH, THE DUST DETECTOR, AND THE LASER RANGING RETROREFLECTOR. THE LM LANDED ON THE LUNAR SURFACE ON JULY 20, 1969. THE EASEP EXPERIMENTS FUNCTIONED NORMALLY FOR ONE LUNATION AFTER WHICH THE EASEP POWER FAILED. THE NON-POWERED LASER RETROREFLECTOR CONTINUES TO BE USEFUL.

\*\*\*\*\*APOLLO 11 LM/EASEP, ALLEY

EXPERIMENT NAME- LASER RANGING RETROREFLECTOR NSSDC ID 69-059C-04

ORIGINAL EXPERIMENT INSTITUTION- U OF MARYLAND

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - C.O. ALLEY U OF MARYLAND COLLEGE PARK, MD

EXPERIMENT STATUS OF OPERATION- NORMAL

EXPERIMENT BRIEF DESCRIPTION

THE LASER RANGING RETROREFLECTOR (LRRR) WHICH WAS LEFT ON THE LUNAR SURFACE BY THE APOLLO 11 CREW WAS A RETROREFLECTOR ARRAY WITH A FOLDING SUPPORT STRUCTURE FOR AIMING AND ALIGNING THE ARRAY TOWARD EARTH. THE ARRAY WAS BUILT OF CUBES OF FUSED SILICA. LASER RANGING BEAMS FROM EARTH WERE REFLECTED BACK TO THEIR POINT OF ORIGIN FOR PRECISE MEASUREMENT OF EARTH-MOON DISTANCES, MOTION OF THE MOON'S CENTER OF MASS, LUNAR RADIUS, AND EARTH GEOPHYSICAL INFORMATION. THIS REFLECTOR HAS OPERATED FOR A NUMBER OF YEARS, AND HAS RETURNED GOOD RESULTS TO DATE (JUNE 1974).

DATA SET NAME- FILTERED AND UNFILTERED LASER PHOTON NSSDC ID 69-059C-04C  
DETECTIONS ON MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/21/69 TO 06/26/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 6 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 800-BPI, BINARY, 7-TRACK TAPE CONTAINING DATA ON THE CURRENT DEPOSITION FROM THE APOLLO LUNAR LASER RANGING EXPERIMENT FROM APOLLUS 11 AND 14. THERE ARE SEVEN FILES OF DATA -- (1) FILTERED DATA FROM AUGUST 1969 THROUGH DECEMBER 1970, (2) UNFILTERED DETECTIONS FOR 1969, (3) UNFILTERED DETECTIONS FOR JANUARY TO JUNE 1970, (4) UNFILTERED DETECTIONS FOR JULY TO DECEMBER 1970, (5) UNFILTERED DETECTIONS FROM JANUARY TO DECEMBER 1971, (6) FILTERED DATA FOR JULY THROUGH DECEMBER 1972, AND (7) UNFILTERED DATA FOR JANUARY THROUGH JULY 1973. THE DATA WERE WRITTEN ORIGINALLY ON A CDC 6600 COMPUTER. THERE ARE TWO DIFFERENT KINDS OF DATA -- RUN DATA, WHICH ARE DESIGNATED BY A 'Z' IN THE BEGINNING OF EVERY 80-CHARACTER LOGICAL RECORD, AND SHOT DATA, WHICH ARE DESIGNATED BY A 'P' IN THE BEGINNING OF EVERY 80-CHARACTER LOGICAL RECORD. THIS TAPE IS BLOCKED AT 64 LOGICAL RECORDS PER PHYSICAL RECORD. EACH PHYSICAL RECORD HAS FOUR CHARACTERS THAT WERE APPENDED AFTER THE TAPE WAS DUPLICATED ON THE IBM 7094 COMPUTER. THE FILTERED DATA CONSIST OF PHOTON DETECTIONS SUBMITTED TO A DATA FILTERING PROCEDURE ASSUMING LINEARITY OF D-C RESIDUALS OVER A RELATIVELY SHORT TIME INTERVAL AND RELYING ON POISSON STATISTICS FOR THE LEVEL OF CONFIDENCE IN A COLLECTION IDENTIFIED BY THE FILTER. UNFILTERED DATA ARE REAL DATA HEAVILY INTERSPERSED WITH NOISE PHOTONS FROM ANY OF THE VARIOUS SOURCES OF STRAY LIGHT. AN ATTEMPT TO USE THE DATA IN A SIMPLE GAUSSIAN APPLICATION WOULD RESULT IN A SOLUTION CLOSELY ADHERING TO THE PREDICTION EPHEMERIS USED TO CONTROL THE DETECTOR RANGE GATING. SOME FILTERING PROCESS MUST BE APPLIED TO THE DATA FOR EFFECTIVE USE. THE RUN DATA RECORDED INCLUDE A JULIAN DATE, CLOCK ERROR, AMBIENT TEMPERATURE, AMBIENT RELATIVE HUMIDITY, PERCENT OF SATURATION, AND WIND SPEED. THE SHOT DATA INCLUDE LASER ENERGY IN JOULES X 10, LASER FREQUENCY IN HZ X 1E10, PULSE LENGTH IN SEC X 1E10, OBSERVATIONAL RESOLUTION, PHOTOMULTIPLIER DARK COUNT (BACKGROUND), MOON COUNT RATE, STAR COUNT RATE, CALIBRATION STAR IDENTIFICATION, FILTER SPECTRAL WIDTH, FILTER SPATIAL WIDTH, NUMBER OF SHOTS FIRED THIS RUN, YEAR, MONTH, AND DAY.

\*\*\*\*\*APOLLO 11 LM/EASEP. SHOEMAKER

EXPERIMENT NAME- LUNAR FIELD GEOLOGY NSSDC ID 69-059C-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - E.M. SHOEMAKER CAL TECH PASADENA, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 07/20/69

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT ENTAILED THE COLLECTION AND DOCUMENTATION OF GEOLOGIC ROCK SAMPLES. THE SAMPLES WERE COLLECTED USING TONGS, SCOOPS, A HAMMER, AND CORE TUBES. A CLOSEUP STEREOSCOPIC SURFACE CAMERA, THE MODIFIED 70-MM HASSELBLAD, AND A 16-MM CAMERA USED IN EXPERIMENT 69-059A-01 (PHOTOGRAPHY) WERE ALSO USED TO DOCUMENT THE FINDINGS OF THE ASTRONAUTS AND THEIR TRAVERSE OF 100 M FROM THE LANDING SITE. ALL SAMPLES WERE PLACED IN VACUUM TIGHT



CONTAINERS, AND THE 21 KG OF ROCK SAMPLES FROM THE CONTINGENCY AND THE BULK AND DOCUMENTED CONTAINERS WERE BROUGHT BACK TO EARTH FOR USE IN EXTENSIVE SCIENTIFIC INVESTIGATIONS OF THE COMPOSITION OF THE MOON AND ITS ORIGIN.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 69-059C-01G  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/20/69 TO 07/20/69 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REFL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE FOR ALL APOLLO MISSIONS. THE DATA BASE IS MAINTAINED BY THE CURATOR'S OFFICE AT THE NASA JOHNSON SPACE CENTER (JSC). THIS VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) A BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY WITH AUTHOR INDEX MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC, OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE TN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE ANALYZED PROPERTY, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC., (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER. THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY. THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION, WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER, THE ENTRIES ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON NSSDC ID 69-059C-01H  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/20/69 TO 07/20/69 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 7 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG OF MINERALOGY AND PETROLOGY OF APOLLO 11 LUNAR SAMPLES. THE CATALOG CONTAINS DESCRIPTIONS OF (1) GEOLOGIC

SETTING, (2) ROCK TYPES, (3) SHOCK METAMORPHISM, (4) INTERPRETATIONS OF LUNAR EVOLUTION, AND (5) ANALYTIC PROCEDURES. THE SAMPLES WERE MAINLY THIN SECTIONS OF LARGER ROCK SAMPLES. PHOTOGRAPHS OF SAMPLES, TABLES OF COMPOSITIONS, AND PLOTS ARE INCORPORATED. A BIBLIOGRAPHIC FILE CONCERNING THESE SAMPLES IS CONTAINED IN THE PUBLICATION 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES,' NASA-JSC, DECEMBER 15, 1972, AND IS OBTAINABLE ON MICROFILM AT NSSDC (816675).

\*\*\*\*\*APOLLO 12 LM/ALSEP \*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 12 LM/ALSEP NSSDC ID 69-099C  
ALTERNATE NAMES- 04246, ALSEP 12, LEM 12, APOLLO 12C

LAUNCH DATE- 11/14/69 SPACECRAFT WEIGHT IN ORBIT- 4379. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

#### SPACECRAFT BRIEF DESCRIPTION

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING, WHEN THE ASCENT STAGE FUNCTIONED AS A SINGLE SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). THE ALSEP EXPERIMENTS INCLUDED (1) THE PASSIVE SEISMOGRAPH, WHICH WAS DESIGNED TO MEASURE SEISMIC ACTIVITY AND PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR, (2) THE SUPRATHERMAL ION DETECTOR, DESIGNED TO MEASURE THE FLUX COMPOSITION, ENERGY, AND VELOCITY OF LOW-ENERGY POSITIVE IONS, (3) THE COLD CATHODE ION GAUGE, DESIGNED TO MEASURE THE ATMOSPHERE AND ANY VARIATIONS WITH TIME OF SOLAR ACTIVITY SUCH ATMOSPHERE MAY HAVE, (4) THE CHARGED PARTICLE LUNAR ENVIRONMENT EXPERIMENT, DESIGNED TO MEASURE PARTICLE ENERGIES OF SOLAR PROTONS AND ELECTRONS THAT REACH THE LUNAR SURFACE AND TO PROVIDE DATA ON ENERGY DISTRIBUTION OF THESE SOLAR PARTICLES, (5) THE LUNAR SURFACE MAGNETOMETER (LSM), DESIGNED TO MEASURE THE MAGNETIC FIELD AT THE LUNAR SURFACE, AND (6) THE SOLAR WIND SPECTROMETER, WHICH MEASURED THE FLUXES AND SPECTRA OF THE ELECTRONS AND PROTONS THAT EMANATE FROM THE SUN AND REACH THE LUNAR SURFACE.

\*\*\*\*\*APOLLO 12 LM/ALSEP, LATHAM

EXPERIMENT NAME- PASSIVE SEISMIC NSSDC ID 69-099C-03

ORIGINAL EXPERIMENT INSTITUTION- LAMONT-DOHERTY GEO OBS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.V. LATHAM	U OF TEXAS, GALVESTON	GALVESTON, TX
OI - R.F. PRESS	MIT	CAMBRIDGE, MA
OI - G.H. SUTTON	U OF HAWAII	HONOLULU, HI

EXPERIMENT STATUS OF OPERATION- PARTIAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP PACKAGE. IT WAS LOCATED AND DEPLOYED 310 FT (100 M) FROM THE LM IN THE VICINITY OF SURVEYOR 3. THE SEISMOGRAPH EXPERIMENT MEASURED SEISMIC ACTIVITY OF THE MOON AND OBTAINED INFORMATION ON THE

PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE DETECTED SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS, MOONQUAKES, AND METEORITE IMPACTS. IT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE THREE COMPONENTS OF THE SENSOR ASSEMBLY WERE ALIGNED ALONG THE TWO HORIZONTAL AXES LPX, LPY, AND THE VERTICAL AXIS LPZ. A LEVELING STOOL, THERMAL SHROUD, AND RADIOISOTOPE HEATERS COMPRISED THE REST OF THE EXPERIMENT PACKAGE. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION WHICH TRANSMITTED THE DATA BACK TO EARTH.

DATA SET NAME- SEISMIC EVENT TAPES

NSSDC ID 69-099C-03A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/20/69 TO 01/12/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 179 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MAGNETIC TAPES OF SEISMIC EVENTS DETECTED IN THE LONG-PERIOD COMPONENTS (RESONANT PERIOD OF 15 SEC) BY MANUAL SEARCH BY THE EXPERIMENTER OF THE COMPRESSED-SCALE PLAYOUTS (DATA SET 69-099C-03B). COPIES WERE THEN MADE OF THE ORIGINAL PSE TAPES FOR THE TIME PERIODS WHEN SEISMIC EVENTS (GROUND MOVEMENTS) WERE OBSERVED. EACH EVENT TAPE CONTAINS DATA FROM ONE STATION ONLY, BUT DATA (TRACES OF GROUND MOTION AMPLITUDES VS. TIME) FROM THE SAME TIME PERIODS WERE COPIED IN CHRONOLOGICAL ORDER ONTO SEPARATE TAPES FOR EACH STATION. THUS, INTERVALS WHICH MAY CONTAIN NO DETECTABLE SIGNAL CAN BE ON THE EVENT TAPE BECAUSE AN EVENT WAS DETECTED AT ANOTHER STATION. THE TAPES WERE WRITTEN IN 7-TRACK BINARY, AT 800-BPI AND ODD PARITY. SEVERAL COMPUTERS WERE USED IN PROCESSING THESE DATA.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF LUNAR  
SEISMIC DATA ON 35-MM MICROFILM

NSSDC ID 69-099C-03B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 05/09/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 3 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35-MM MICROFILM OF EXPERIMENTER-PRODUCED PLOTS CONTAINING 15 SEC RESONANCE LONG PERIOD (LP) X, Y, Z, AND 1-SEC RESONANCE SHORT-PERIOD Z (SPZ) SEISMIC VALUES. TO ENHANCE THE SIGNAL-TO-NOISE RATIO FOR HIGHER FREQUENCY EVENTS, A DIFFERENCE METHOD WAS EMPLOYED IN REDUCTION OF THE DATA. THE ABSOLUTE VALUE OF THE DIFFERENCE BETWEEN CONSECUTIVE DATA POINTS IS SUMMED OVER 40 POINTS FOR LONG-PERIOD DATA (320 POINTS FOR SHORT-PERIOD DATA) AND THIS VALUE IS PLOTTED, YIELDING ONE VALUE FOR EVERY SIX SECONDS OF DATA. CONSECUTIVE POINTS ARE PLOTTED WITH OPPOSITE POLARITY TO YIELD A LINE WITH THE APPEARANCE OF A SEISMOGRAM. COMPONENTS ARE ARRANGED LPX, LPY, LPZ, SPZ, WITH LPX AT THE TOP AND SPZ AT THE BOTTOM. TIME TICKS ARE DISPLAYED EVERY 10 MINUTES AND EACH HOUR (UT) IS LABELED. THE YEAR AND DAY ARE DISPLAYED EVERY 6 HOURS. THE PLOTS ALSO CONTAIN THE VALUES FOR THE APOLLO 14, 15, AND 16 STATIONS FOR THE TIMES THEY ARE IN OPERATION, SIMULTANEOUSLY DISPLAYED ON THE ANALOG CHART. THESE PLOTS ARE USED TO IDENTIFY SEISMIC EVENTS AND TO DETERMINE THEIR START AND STOP TIMES. THE SPX AXIS HAS MALFUNCTIONED SINCE DEPLOYMENT AND NO DATA HAVE BEEN RECEIVED.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF SELECTED LUNAR SEISMIC EVENTS ON 35-MM MICROFILM NSSDC ID 69-099C-03C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/20/69 TO 07/31/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35MM MICROFILMED PLOTS OF SELECTED EVENTS, PRODUCED BY THE EXPERIMENTER FROM THE SEISMIC EVENT TAPES (DATA SET 69-099C-03A) AND THE ARTIFICIAL IMPACT EVENT TAPES (DATA SET 69-099C-03F) TO PROVIDE, IN COMPRESSED SCALE, A VISUAL DISPLAY OF THE CONTENTS OF EACH EVENT TAPE. THESE PLAYOUTS HAVE THE SAME FORMAT AS THE COMPRESSED SCALE PLAYOUTS (DATA SET 69-099C-03B) WITH THE EXCEPTIONS THAT TIME IS NOT CONTINUOUS AND THAT THE AMPLITUDE SCALE ON THE PLOTS IS TWICE THAT OF THE COMPRESSED SCALE PLAYOUTS.

DATA SET NAME- EXPANDED TIME SCALE PLAYOUTS OF SELECTED LUNAR SEISMIC EVENTS ON 35-MM MICROFILM NSSDC ID 69-099C-03D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/26/69 TO 08/08/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE EXPANDED TIME SCALE PLAYOUTS TAKEN DIRECTLY FROM THE PASSIVE SEISMIC EXPERIMENT EVENT TAPES (DATA SET 69-099C-03A) AND NOT PROCESSED IN ANY WAY (E.G., NO FILTERING, SMOOTHING, SIGNAL AVERAGING ETC.). THE PLAYOUTS (USUALLY 10 MIN IN LENGTH) WERE GENERATED FOR ALL LONG-PERIOD SEISMIC EVENTS OBSERVED FROM NOVEMBER 26, 1969 TO AUGUST 8, 1972, WITH PEAK-TO-PEAK SIGNAL AMPLITUDES OF TWO OR MORE DIGITAL UNITS. THE ANNOTATION FORMAT CONSISTS OF YEAR (IN WHICH THE PLAYOUT BEGINS), SKIP X MAG C (WHERE 'SKIP' EQUALS THE TAPE IDENTIFICATION NUMBER, 'MAG' EQUALS A MULTIPLICATIVE FACTOR WHICH ADJUSTS THE SIGNAL AMPLITUDE OF AN EVENT FOR PLOTTING, AND 'C' EQUALS THE LONG-PERIOD COMPONENT WHERE X IS SPX, Y IS LPY, AND Z IS LPZ), DAY OF THE YEAR ON WHICH THE PLAYOUT BEGINS, AND, UNIVERSAL TIME AT WHICH THE PLAYOUT BEGINS. TIME TICKS ARE PLACED AT 1-MIN INTERVALS. THESE TIME MARKS ARE NOT CORRECTED FOR POSSIBLE CLOCK ERRORS. NOTATIONS ON THE SEISMOGRAMS, SUCH AS PHASE PICKS (E.G., P OR S) OR EVENT CLASSIFICATION (E.G., A, B, C, M), ARE NOT PRIMARY DATA BUT INTERPRETATIONS OF THE DATA AND SHOULD BE RECOGNIZED AND USED AS SUCH.

DATA SET NAME- ARTIFICIAL LUNAR IMPACT SEISMIC DATA ON MAGNETIC TAPE NSSDC ID 69-099C-03F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/20/69 TO 08/03/70 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF RECORDED SEISMIC DATA OF IMPACTS ON THE MOON OF MAN-MADE ORIGIN, ON MAGNETIC TAPE. THE TAPES ARE IDENTICAL IN FORMAT TO THE SEISMIC EVENT TAPES (DATA SET 69-099C-03A). COMPRESSED SCALE PLAYOUTS OF THESE ARTIFICIAL IMPACT EVENTS ARE AVAILABLE IN DATA SET 69-099C-03B.

DATA SET NAME- SEISMIC EVENT LOG AS CARD IMAGES ON  
MAGNETIC TAPE

NSSDC ID 69-099C-03G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/20/69 TO 04/21/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG IDENTIFYING ALL SEISMIC EVENTS OBSERVED ON THE LONG PERIOD COMPONENTS OF THE LUNAR SEISMIC NETWORK. IT IS TAPE-GENERATED FROM THE IBM CARDS SUPPLIED BY THE EXPERIMENTER. EVENTS ARE PRESENTED IN CHRONOLOGICAL ORDER WITH THE FOLLOWING PARAMETERS LISTED -- YEAR, DAY OF YEAR, EVENT START AND STOP TIMES (UT), MAXIMUM SIGNAL AMPLITUDES, PLAYOUT, QUALITY, AND TYPE CLASS. A STOP TIME OF '9999' IMPLIES THAT THE EVENT OVERLAPS THE NEXT EVENT. THE AMPLITUDES GIVEN ARE FOR THE VERTICAL AXIS. AMPLITUDES WERE PICKED FROM THE COMPRESSED SCALE PLAYOUTS (DATA SET 69-099C-03B). MOTION AMPLITUDES, EXPRESSED IN MILLIMETERS, ARE PICKED FROM RECORDS PLOTTED AT A SCALE OF 400 DIGITAL UNITS PER IN. A '1' IN THE PLAYOUT COLUMN IMPLIES THAT AN EXPANDED SCALE PLAYOUT (DATA SET 69-099C-03D) IS AVAILABLE FOR THAT EVENT. A QUALITY FACTOR IS ASSIGNED WHENEVER THE RECORD FOR AN EVENT IS OTHER THAN NORMAL. PRIORITY IS GIVEN TO THE SMALLEST APPROPRIATE NUMBER -- (1) NO DATA AT THE TIME THE EVENT OCCURRED, (2) CLOCK RATE ERROR, (3) NOISY RECORD, AND (4) RECORD MASKED BY ANOTHER EVENT. THE EVENT TYPE IS AN INTERPRETATION OF THE POSSIBLE ORIGIN OF THE EVENT WHERE (A) IS A CLASSIFIED MOONQUAKE, (M) IS A SUSPECTED MOONQUAKE, (C) IS A SUSPECTED METEOROID IMPACT, (Z) IS MOSTLY SHORT PERIOD, (X) IS AN UNUSUAL EVENT, (L) IS A LM IMPACT, AND (S) IS A SATURN IV-B IMPACT. THE EVENT CLASS GIVES THE CLASSIFICATION NUMBER FOR TYPE A EVENTS. ALL EVENTS IN THE SAME CLASS HAVE MATCHING WAVEFORMS.

\*\*\*\*\*APOLLO 12 LM/ALSEP, SHOEMAKER

EXPERIMENT NAME- LUNAR FIELD GEOLOGY

NSSDC ID 69-099C-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - E.M. SHOEMAKER CAL TECH PASADENA, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 11/20/69

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT ENTAILED THE COLLECTION AND DOCUMENTATION OF GEOLOGIC ROCK SAMPLES. THE SAMPLES WERE COLLECTED USING TONGS, SCOOPS, A HAMMER, AND CORE TUBES. A CLOSEUP STEREOSCOPIC SURFACE CAMERA, THE MODIFIED 70-MM

HASSELBLADS, AND A 16-MM CAMERA USED IN EXPERIMENT 69-099A-01 (PHOTOGRAPHY) WERE ALSO USED TO DOCUMENT THE FINDINGS OF THE ASTRONAUTS AND THEIR TRAVERSE OF 1.5 KM FROM THE LANDING SITE. ALL SAMPLES WERE PLACED IN VACUUM TIGHT CONTAINERS, AND THE 34 KG OF ROCK SAMPLES FROM THE CONTINGENCY AND BOTH THE BULK AND DOCUMENTED CONTAINERS WERE BROUGHT BACK TO EARTH FOR USE IN EXTENSIVE SCIENTIFIC INVESTIGATIONS OF THE COMPOSITION OF THE MOON AND ITS ORIGIN.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 69-099C-01G  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 11/20/69 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE FOR ALL APOLLO MISSIONS. THE DATA BASE IS MAINTAINED BY THE CURATOR'S OFFICE AT NASA JOHNSON SPACE CENTER (JSC). THIS VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) A BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS, CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY WITH AUTHOR INDEX MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC, OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE TN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE ANALYZED PROPERTY, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC., (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER, THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY. THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION, WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER, THE ENTRIES ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE, AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON NSSDC ID 69-099C-01H  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 11/20/69 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 6 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG OF LUNAR SAMPLE INFORMATION ABOUT APOLLO 12 LUNAR SAMPLES. DESCRIPTIONS OF THE SAMPLE-COLLECTING TOOLS, TECHNIQUES, CONTINGENCY, SELECTED, DOCUMENTED, AND TOTE-BAG SAMPLES ARE GIVEN. MINERALOGICAL/PETROLOGICAL, CHEMICAL, GAMMA-RAY SPECTROMETRY, NOBLE GAS, TOTAL CARBON, ORGANIC MASS-SPECTROMETRY, AND ORGANIC-MONITOR ANALYSES RESULTS ARE GIVEN AND DISCUSSED. PHOTOGRAPHS, TABLES, AND PLOTS ARE INCORPORATED. A TABLE OF SURFACE PHOTOGRAPHS (IN CHRONOLOGICAL ORDER) IS ALSO INCLUDED.

\*\*\*\*\*APOLLO 12 LM/ALSEP, SONETT

EXPERIMENT NAME- LUNAR SURFACE MAGNETOMETER

NSSDC ID 69-099C-04

ORIGINAL EXPERIMENT INSTITUTION- NASA-ARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - C.P. SONETT  
OI - P. DYAL

NASA-ARC  
NASA-ARC

MOFFETT FIELD, CA  
MOFFETT FIELD, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 04/03/70

EXPERIMENT BRIEF DESCRIPTION

THE LUNAR SURFACE MAGNETOMETER IS PART OF THE ALSEP PACKAGE AND CONSISTS OF THREE FLUXGATE SENSORS LOCATED ON ORTHOGONAL 5-FT BOOMS. THE SENSORS ARE MOUNTED ON GIMBALS ALLOWING THEIR MEASUREMENT AXES TO BE INTERCHANGED FOR PURPOSES OF CALIBRATION AND SITE SURVEY. THE INSTRUMENT WAS DESIGNED TO MEASURE THE MOON'S MAGNETIC FIELD, AND OPERATED IN THE RANGES MINUS TO PLUS 100, 200, OR 400 GAMMAS. IT WAS ALSO EXPECTED TO YIELD INFORMATION ABOUT THE LUNAR GROSS ELECTRICAL DIFFUSIVITY, THE EXISTENCE OF A MOLTEN CORE, THE EARTH'S MAGNETIC TAIL, AND LOCAL MAGNETIC ANOMALIES. THE INSTRUMENT MEASURED THE MAGNETIC FIELD CONSTANTLY FOR ABOUT THREE WEEKS AFTER DEPLOYMENT, THEN ON THE DAYSIDE CONTINUOUSLY FOR SEVERAL MONTHS, THEN ON THE DAYSIDE VERY INTERMITTENTLY INTO 1972.

DATA SET NAME- 0.3-SEC MAGNETIC VECTORS ON TAPE

NSSDC ID 69-099C-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/19/69 TO 04/03/70 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 35 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF EXPERIMENTER-SUPPLIED MAGNETIC TAPES WRITTEN IN 556-BPI, 7-TRACK, DCS BINARY FORMAT ON AN IBM 7040/7094 COMPUTER. LOGICAL AND PHYSICAL RECORDS HAVE 751 AND 460 WORDS, RESPECTIVELY. EACH LOGICAL DATA RECORD CONTAINS THE TIME FOR THE FIRST DATA POINT, AND THE CARTESIAN COMPONENTS OF 500 SUCCESSIVE MAGNETIC FIELD VECTORS. SINCE ONE DATA POINT WAS OBTAINED EVERY 0.3 SEC, EACH LOGICAL RECORD COVERS 2.5 MIN OF DATA. FIELD COMPONENTS ARE GIVEN IN A COORDINATE SYSTEM WITH X RADially OUTWARD FROM THE LOCAL LUNAR SURFACE AND Y AND Z TANGENT TO THE SURFACE AND DIRECTED EASTWARD AND NORTHWARD, RESPECTIVELY. TYPICALLY, EACH TAPE CONTAINS THREE

DAYS OF DATA. THE DATA COVER THE PERIOD FROM NOVEMBER 19, 1969, THROUGH APRIL 3, 1970, WITH THE FOLLOWING GAPS -- DECEMBER 12 THROUGH DECEMBER 18, 1969, JANUARY 4 THROUGH JANUARY 17, 1970, FEBRUARY 3 THROUGH FEBRUARY 15, 1970, MARCH 6 THROUGH MARCH 17, 1970.

DATA SET NAME- FILTERED AND DECIMATED MAGNETIC FIELD DATA ON MAGNETIC TAPE NSSDC ID 69-099C-04C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/28/69 TO 12/03/69 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A SAMPLE 7-TRACK, 556-BPI BCD MAGNETIC TAPE CONTAINING FILTERED AND DECIMATED MAGNETIC FIELD DATA AS SUBMITTED BY THE EXPERIMENTER. THE TAPE CONTAINS A HEADER RECORD AND SUCCESSIVE GROUPS OF THREE PHYSICAL RECORDS WHERE EACH SUCH GROUP CONSTITUTES ONE LOGICAL RECORD. THE 1602-CHARACTER HEADER RECORD INCLUDES THE DEGREE OF DECIMATION AND THE FILTER WEIGHTS USED. THE FIRST PHYSICAL RECORD IN EACH LOGICAL RECORD CONTAINS THE TIME OF THE FIRST SUBSEQUENT VECTOR. THE SECOND AND THIRD PHYSICAL RECORDS EACH CONTAIN 50 MAGNETIC VECTORS (CARTESIAN COMPONENTS IN ALSEP COORDINATES AND FIELD MAGNITUDE). NSSDC WILL HOLD A LIST OF TIMES FOR WHICH THE ORIGINAL DATA WERE SUBJECTED TO FILTERING AND DECIMATION AND WILL ACQUIRE APPROPRIATE TAPES FROM THE EXPERIMENTER AS REQUEST ACTIVITY WARRANTS.

\*\*\*\*\*APOLLO 14 CSM\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 14 CSM NSSDC ID 71-008A  
ALTERNATE NAMES- PL-704A, 04900

LAUNCH DATE- 01/31/71 SPACECRAFT WEIGHT IN ORBIT- 29290. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 02/09/71

EPOCH DATE- 02/03/71 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 117. MIN  
APOAPSIS- 123. KM ALT PERIAPSIS- 100. KM ALT INCLINATION- 14.1 DEG

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WAS THE THIRD APOLLO MISSION TO LAND MEN ON THE MOON. ON FEBRUARY 5, 1971, THE LUNAR MODULE (LM) LANDED TWO MEN IN THE HILLY UPLAND REGION 24 KM NORTH OF THE RIM OF FRA MAURO CRATER. WHILE THE PILOTED COMMAND MODULE (CM) CONTINUED IN A LUNAR EQUATORIAL ORBIT. THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS PLACED ON THE SURFACE OF THE MOON, AND SAMPLES OF THE LUNAR SURFACE WERE ACQUIRED. VARIOUS FRAMES OF 16-MM, 35-MM, 70-MM, AND 5-IN. MAPPING FILM WERE EXPOSED BY THE ASTRONAUTS FROM THE LM AND CM AND ON THE LUNAR SURFACE. PERFORMANCE WAS GOOD FOR MOST ASPECTS OF THE MISSION. FOR FURTHER DESCRIPTION OF THE LUNAR MODULE, SEE SPACECRAFT 71-008C.

\*\*\*\*\*APOLLO 14 CSM, HOWARD



EXPERIMENT NAME- DOWN-LINK BISTATIC RADAR OBSERVATIONS      NSSDC ID 71-008A-04

ORIGINAL EXPERIMENT INSTITUTION- STANFORD U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - H.T.	HOWARD	STANFORD U	STANFORD, CA
OI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - A.M.	PETERSON	STANFORD U	STANFORD, CA
OI - G.L.	TYLER	STANFORD U	STANFORD, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST EXPERIMENT DATA RECORDED- 02/06/71

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED THE S-BAND (13-CM) AND VERY HIGH FREQUENCY (VHF, 116-CM) TRANSMITTERS ON THE COMMAND SERVICE MODULE (CSM). THE CSM WAS ORIENTED TO DIRECT THE TRANSMISSIONS TO AN AREA ABOUT 5-10 KM IN DIAM ON THE LUNAR SURFACE. THE RADIO SIGNALS REFLECTED FROM THE LUNAR SURFACE WERE RECEIVED AT THE EARTH IN A MANNER THAT PRESERVED THE FREQUENCY, PHASE, POLARIZATION, AND AMPLITUDE INFORMATION. DIFFERENCES BETWEEN THE KNOWN CHARACTERISTICS OF THE TRANSMITTED SIGNALS AND THE CHARACTERISTICS OF THE ECHOES FROM THE LUNAR SURFACE WERE USED IN CONJUNCTION WITH SCATTERING THEORY TO DERIVE QUANTITATIVE INFERENCES ABOUT THE MOON. THE LUNAR PROPERTIES INFERRED WERE THE DIELECTRIC CONSTANT, THE AVERAGE SLOPE AND SLOPE PROBABILITY, DENSITY, SMALL-SCALE SURFACE ROUGHNESS, AND EMBEDDED ROCKS TO A DEPTH OF 20 M.

DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 13-CM      NSSDC ID 71-008A-04A  
BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 02/06/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 13-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI, BINARY MAGNETIC TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES -- A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH, THE FIRST FIVE RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX. RECORD 1 CONTAINS  $J_{11}(K)$ , RECORD 2 CONTAINS  $J_{22}(K)$ , RECORD 3 CONTAINS THE REAL PART OF  $J_{12}(K)$ , RECORD 4 CONTAINS THE IMAGINARY PART OF  $J_{12}(K)$ , AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD 6 OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE,

THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.

DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 116-CM NSSDC ID 71-008A-04B  
BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 02/06/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 116-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 RPI, BINARY MAGNETIC TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES -- A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH, THE FIRST FIVE RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX, J. RECORD 1 CONTAINS  $J_{11}(K)$ , RECORD 2 CONTAINS  $J_{22}(K)$ , RECORD 3 CONTAINS THE REAL PART OF  $J_{12}(K)$ , RECORD 4 CONTAINS THE IMAGINARY PART OF  $J_{12}(K)$ , AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD SIX OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE, THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.

DATA SET NAME- ANALYZED 13-CM AND 116-CM BIASTIC RADAR NSSDC ID 71-008A-04C  
LUNAR OBSERVATIONS ON MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 02/06/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO AS THE INTEGRAL TAPES BY THE EXPERIMENTER, IS A COMPLETE SET OF ANALYZED DATA RECORDS DERIVED FROM THE REDUCED DATA RECORDS (OR JM DOPTRACK TAPES, DATA SETS 71-008A-04A AND 71-008A-04B). THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI, BINARY TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THE DATA CONTAIN CERTAIN PROPERTIES OF THE REDUCED DATA AS WELL AS INFERRED PROPERTIES OF THE LUNAR SURFACE. EACH TAPE FILE IS COMPOSED OF ONE HEADER RECORD FOLLOWED BY MANY DATA RECORDS. EACH HEADER RECORD CONTAINS -- A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF DATA RECORDS FOLLOWING THE HEADER RECORD. DATA RECORDS INCLUDE -- THE POLARIZED POWER, NORMALIZED POLARIZED POWER, UNPOLARIZED POWER, EQUIVALENT AREA BANDWIDTH, NORMALIZED ABSOLUTE MOMENT BANDWIDTH, NORMALIZED SECOND MOMENT BANDWIDTH, CENTROID OF THE ECHO SPECTRUM, RMS SLOPE INFERRED FROM EQUIVALENT AREA BANDWIDTH, HANDSCALED 1/2 POWER ECHO BANDWIDTH, A DATA VALIDITY FLAG, SPACECRAFT ANTENNA GAIN (OR ZERO), AND ALL THE EPHEMERIS AND ANCILLARY DATA CONTAINED ON DATA RECORD SIX IN EACH DATA FRAME OF THE REDUCED DATA TAPES (DATA SETS 71-008A-04A AND 71-008A-04B).

\*\*\*\*\*APOLLO 14 LM/ALSEP\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 14 LM/ALSEP NSSDC ID 71-008C  
ALTERNATE NAMES- ALSEP 14, LEM 14, 04905, APOLLO 14C

LAUNCH DATE- 01/31/71 SPACECRAFT WEIGHT IN ORBIT- 4857. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 14 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE LUNAR HIGHLANDS (3 DEG 39 MIN 1 SEC S LATITUDE, 17 DEG 27 MIN 55 SEC W LONGITUDE). THE NUCLEAR POWERED ALSEP WAS DEPLOYED AT THE LANDING SITE AND INCLUDED EXPERIMENTS TO STUDY THE SEISMIC WAVES, MAGNETIC FIELDS, SOLAR WIND COMPOSITION AND INTERACTION WITH THE MOON, LUNAR ATMOSPHERE, AND IONIC ENVIRONMENT.

\*\*\*\*\*APOLLO 14 LM/ALSEP, FALLER

EXPERIMENT NAME- LASER RANGING RETROREFLECTOR NSSDC ID 71-008C-09

ORIGINAL EXPERIMENT INSTITUTION- CONN. WESLEYAN U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - J. FALLER CONN. WESLEYAN U MIDDLETOWN, CT

EXPERIMENT STATUS OF OPERATION- NORMAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO PERMIT GROUND-BASED STATIONS TO CONDUCT SHORT-PULSE LASER RANGING TO A CORNER REFLECTOR ARRAY ON THE LUNAR SURFACE AT THE FRA MAURO SITE. THIS INSTRUMENT AND THOSE AT APOLLO 11 (TRANQUILITY BASE) AND AT THE APOLLO 15 SITE IN THE HADLEY/APENNINE REGION PROVIDED A NETWORK (WELL-SEPARATED IN LONGITUDE AND LATITUDE) OF STATIONS TO PERMIT A COMPLETE GEOMETRICAL SEPARATION OF THE LUNAR LIBRATIONS. THE REFLECTORS PERMITTED A DISCRIMINATION OF THE 3-YR PHYSICAL LIBRATIONS. THEY ALSO PROVIDED INFORMATION ABOUT THE EARTH AND ITS CONTINENTAL DRIFT MOTIONS AS WELL AS VERY ACCURATE DETERMINATIONS OF THE EARTH-MOON DISTANCE AND THE MOON'S ORBITAL MOTIONS. THE EARTH'S NORTH POLE POSITION COULD BE DETERMINED TO PLUS OR MINUS 15 CM. THE INSTRUMENT WAS AN ARRAY OF 100 SMALL FUSED-SILICA CORNER CUBES EACH 3.8 CM IN DIAMETER. IT WAS DEPLOYED ON THE FIRST EVA, 30 M WEST OF THE CENTRAL STATION (200 M WEST OF THE LM), WAS LEVELED, AND WAS FACED TOWARD THE EARTH. EACH CORNER CUBE REFLECTED LIGHT PARALLEL TO THE INCIDENT DIRECTION, ENSURING THAT THE REFLECTED LASER PULSE RETURNED TO ITS PLACE OF ORIGIN ON THE EARTH. SUCCESSFUL RANGE MEASURES WERE FIRST OBTAINED FROM THE MCDONALD OBSERVATORY IN TEXAS ON FEBRUARY 5, 1971, THE DAY THE EXPERIMENT WAS DEPLOYED. NO DEGRADATION WAS SUFFERED FROM THE LM LIFTOFF.

DATA SET NAME- FILTERED AND UNFILTERED LASER PHOTON  
DETECTIONS ON MAGNETIC TAPE

NSSDC ID 71-008C-09A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/05/71 TO 06/26/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 5 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 800-BPI, BINARY, 7-TRACK TAPES CONTAINING DATA ON THE CURRENT DEPOSITION FROM THE LUNAR LASER RANGING EXPERIMENTS ON APOLLOS 11 AND 14. THERE ARE SEVEN FILES OF DATA -- (1) FILTERED DATA FROM NOVEMBER 1969 THROUGH DECEMBER 1970, (2) UNFILTERED DETECTIONS FOR NOVEMBER-DECEMBER 1969, (3) UNFILTERED DETECTIONS FOR JANUARY-JUNE 1970, (4) UNFILTERED DETECTIONS FOR JULY-DECEMBER 1970, (5) UNFILTERED DETECTIONS FOR JANUARY-DECEMBER 1971, (6) FILTERED DATA FOR JULY-DECEMBER, 1972, AND (7) UNFILTERED DATA FOR JANUARY-JULY, 1973. THE DATA WERE WRITTEN ORIGINALLY ON A CDC 6600 COMPUTER. THERE ARE TWO DIFFERENT KINDS OF DATA -- RUN DATA, WHICH ARE DESIGNATED BY A 'Z', AND SHOT DATA, DESIGNATED BY A 'P' IN THE BEGINNING OF EVERY 80-CHARACTER LOGICAL RECORD. THIS TAPE IS BLOCKED AT 64 LOGICAL RECORDS PER PHYSICAL RECORD. EACH PHYSICAL RECORD HAS FOUR CHARACTERS THAT WERE APPENDED AFTER THE TAPE WAS DUPLICATED ON THE IBM 7094 COMPUTER. FILTERED DATA CONSIST OF PHOTON DETECTIONS SUBMITTED TO A DATA FILTERING PROCEDURE ASSUMING LINEARITY OF D-C RESIDUALS OVER A RELATIVELY SHORT TIME INTERVAL AND RELYING ON POISSON STATISTICS FOR THE LEVEL OF CONFIDENCE IN A COLLECTION IDENTIFIED BY THE FILTER. UNFILTERED DATA ARE REAL-TIME DATA HEAVILY INTERSPERSED WITH NOISE PHOTONS FROM ANY OF THE VARIOUS SOURCES OF STRAY LIGHT. AN ATTEMPT TO USE THE DATA IN A SIMPLE GAUSSIAN APPLICATION WOULD RESULT IN A SOLUTION CLOSELY ADHERING TO THE PREDICTION EPHEMERIS USED TO CONTROL THE DETECTOR RANGE GATING. SOME FILTERING PROCESS MUST BE APPLIED TO THE DATA FOR EFFECTIVE USE. THE RUN DATA RECORDED ARE JULIAN DATE, CLOCK ERROR, AMBIENT TEMPERATURE, AMBIENT RELATIVE HUMIDITY AND PERCENT OF SATURATION, AND WIND SPEED. THE SHOT DATA ARE LASER ENERGY IN JOULES X 10, LASER FREQUENCY IN HZ X 1E10, PULSE LENGTH IN SEC X 1E10, OBSERVATIONAL RESOLUTION, PHOTOMULTIPLIER DARK COUNT (BACKGROUND), MOON COUNT RATE, STAR COUNT RATE, CALIBRATION STAR

IDENTIFICATION, FILTER SPECTRAL WIDTH, FILTER SPATIAL WIDTH, NUMBER OF SHOTS  
FIRED THIS RUN, YEAR, MONTH, AND DAY.

\*\*\*\*\*APOLLO 14 LM/ALSEP, KOVACH

EXPERIMENT NAME- ACTIVE SEISMIC

NSSDC ID 71-008C-05

ORIGINAL EXPERIMENT INSTITUTION- STANFORD U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - R.L. KOVACH

STANFORD U

STANFORD, CA

OI - J.S. WATKINS

U OF TEXAS, GALVESTON GALVESTON, TX

EXPERIMENT STATUS OF OPERATION- PARTIAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO GENERATE AND MONITOR SEISMIC WAVES IN THE MOON NEAR THE SURFACE IN ORDER TO STUDY THE INTERNAL STRUCTURE TO A DEPTH OF 460 M. THE SEISMIC ENERGY SOURCE USED WAS THE THUMPER DEVICE, WHICH CONTAINED 21 SMALL EXPLOSIVE CHARGES. THE MORTAR PACKAGE CONTAINING FOUR HIGH-EXPLOSIVE GRENADES WAS PLANTED 91 M FROM THE LM, BUT ITS DETONATION FROM EARTH WAS POSTPONED UNTIL THE OTHER EXPERIMENTS WERE COMPLETED TO AVOID DAMAGING THEM. THE THUMPER DEVICE PROVIDED DATA THAT INDICATED THAT TWO P-WAVE VELOCITIES WERE MEASURED AT THE FRA MAURO SITE. THE NEAR SURFACE HAS A SEISMIC WAVE VELOCITY OF 104 M/SEC. AND A SUBLAYER STARTING AT A DEPTH OF 8.5 M HAS A VELOCITY OF 299 M/SEC. ESTIMATES OF THE THICKNESS OF THIS SUBSTRATUM RANGE FROM 38 TO 76 M. WHICH IS PROBABLY INDICATIVE OF THE DEPTH OF THE FRA MAURO FORMATION. THE EQUIPMENT CONSISTED OF A STAFF WITH THE CHARGE INITIATORS MOUNTED ON THE LOWER END OF ITS BASE. A CABLE CONNECTING THE STAFF (THUMPER) TO THE CENTRAL STATION, GEOPHONES (MINIATURE SEISMOMETERS) FOR RECORDING THE WAVES, AND A THREE-CHANNEL AMPLIFIER WITH LOG COMPRESSOR FOR TELEMETERING THE EARTH.

DATA SET NAME- ACTIVE SEISMIC EVENT DATA ON MAGNETIC  
TAPE

NSSDC ID 71-008C-05A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/15/71 TO 02/15/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A MAGNETIC TAPE OF THE ACTIVE SEISMIC EVENT DATA WRITTEN AT 800 BPI IN BINARY 7-TRACK, ON A UNIVAC 1108 COMPUTER. THE DATA WERE RECORDED BY GEOPHONES AND CONSISTED OF THE SEISMIC SIGNALS GENERATED BY FOUR GRENADE FIRINGS FROM A MORTAR ACTIVATED BY A SIGNAL FROM EARTH, AND 13 SMALL EXPLOSIONS CREATED BY A THUMPER ACTIVATED BY THE ASTRONAUTS. THE ORIGINAL DATA ARE ON REFORMATTED-LOG COMPRESSED TAPES. FIVE SEC OF SEISMIC DATA WERE RECORDED FOR EACH THUMPER FIRING. TWENTY-ONE THUMPER SHOTS WERE PLANNED BUT SEVERAL WERE SKIPPED TO GAIN EXTRAVEHICULAR ACTIVITY (EVA) TIME. THIRTEEN SUCCESSFUL SHOTS WERE RECORDED FROM THUMPER FIRINGS AT POSITIONS 1 (LOCATED AT GEOPHONE 3), 2, 3, 4, 7, 11 (LOCATED AT GEOPHONE 2), 12, 13, 17, 18, 19, 20, AND 21 (LOCATED AT GEOPHONE 1). EACH POSITION WAS 4.6 M APART ALONG THE GEOPHONE LINE WHICH WAS IN A SOUTHERLY DIRECTION FROM THE CENTRAL STATION. THE SEISMIC SIGNALS PRODUCED BY THUMPER

FIRINGS WITHIN 9 MI OF A GEOPHONE HAD AN EXTREMELY IMPULSIVE BEGINNING AND SATURATED THE DYNAMIC RANGE OF THE AMPLIFIER FOR ABOUT 0.5 SEC. THE PREDOMINANT FREQUENCY OF THESE SIGNALS RANGE FROM 27 TO 29 HZ. SHOTS FURTHER FROM THE GEOPHONE HAD MORE EMERGED BEGINNINGS WITH THE GROUND MOTION WAVE TRAIN BUILDING TO A MAXIMUM AMPLITUDE WITHIN THE FIRST 0.25 TO 0.5 SEC FROM ONSET OF THE SIGNAL AND THEN GRADUALLY DECREASING IN AMPLITUDE. THE PEAK AMPLITUDE OF THE RECORDED SIGNALS TYPICALLY DECREASES BY A FACTOR OF APPROXIMATELY 60 IN 61 M. SIGNALS WERE ALSO RECORDED WHILE THE ACTIVE SEISMIC EXPERIMENT WAS OPERATING IN A PASSIVE LISTENING MODE.

\*\*\*\*\*APOLLO 14 LM/ALSEP, LATHAM

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID 71-008C-04

ORIGINAL EXPERIMENT INSTITUTION- LAMONT-DOHERTY GEO OBS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.V.	LATHAM	U OF TEXAS, GALVESTON	GALVESTON, TX
OI - W.M.	EWING	COLUMBIA U	NEW YORK, NY
OI - R.F.	PRESS	MIT	CAMBRIDGE, MA
OI - G.	SUTTON	U OF HAWAII	HONOLULU, HI

EXPERIMENT STATUS OF OPERATION- PARTIAL

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP. IT WAS LOCATED AND DEPLOYED 98 M FROM THE LM. THIS EXPERIMENT WAS DESIGNED TO MEASURE SEISMIC ACTIVITY OF THE MOON AND TO OBTAIN INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE WAS ALSO DESIGNED TO DETECT SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS, MOONQUAKES, AND METEORITE IMPACTS. THE EXPERIMENT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE THE SENSOR ASSEMBLY, THE LEVELING STOOL, THE THERMAL SHROUD, AND THE RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION, WHICH TRANSMITTED THE DATA BACK TO EARTH. INFORMATION ABOUT THE INTERIOR TO DEPTHS OF APPROXIMATELY 100 KM HAVE BEEN OBTAINED FROM THIS SEISMOMETER AND FROM THE APOLLO 11 MISSION SEISMOMETER LEFT ON THE MOON AT TRANQUILITY BASE.

DATA SET NAME- SEISMIC EVENT TAPES

NSSDC ID 71-008C-04B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 01/12/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 153 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MAGNETIC TAPES OF SEISMIC EVENTS DETECTED IN THE LONG-PERIOD COMPONENTS (RESONANT PERIOD OF 15 SEC) BY MANUAL SEARCH BY THE EXPERIMENTER OF THE COMPRESSED SCALE PLAYOUTS BY THE EXPERIMENTER (DATA SET 71-008C-04C). COPIES WERE THEN MADE OF THE ORIGINAL PSE TAPES FOR THE TIME PERIODS WHERE SEISMIC EVENTS WERE OBSERVED. EACH EVENT TAPE CONTAINS DATA FROM ONE STATION ONLY, BUT DATA (TRACES OF GROUND MOTION AMPLITUDES VS TIME) FROM THE SAME TIME PERIODS WERE COPIED IN CHRONOLOGICAL ORDER ONTO SEPARATE TAPES FOR EACH STATION. THUS, INTERVALS WHICH MAY CONTAIN NO

DETECTABLE SIGNAL CAN BE ON THE TAPE BECAUSE AN EVENT WAS DETECTED AT ANOTHER STATION. THE TAPES WERE WRITTEN IN 7-TRACK, BINARY, AT 800 BPI AND ODD PARITY. SEVERAL COMPUTERS WERE USED IN PROCESSING THESE DATA.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF LUNAR NSSDC ID 71-008C-04C  
SEISMIC DATA ON 35-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/05/71 TO 05/11/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 3 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35-MM MICROFILM OF EXPERIMENTER-PRODUCED PLOTS CONTAINING 15 SEC RESONANCE LONG-PERIOD (LP) X, Y, Z, AND 1 SEC RESONANCE SHORT-PERIOD Z (SPZ) SEISMIC VALUES. TO ENHANCE THE SIGNAL-TO-NOISE RATIO FOR HIGHER FREQUENCY EVENTS, A DIFFERENCE METHOD WAS EMPLOYED IN REDUCTION OF THE DATA. THE ABSOLUTE VALUE OF THE DIFFERENCE BETWEEN CONSECUTIVE DATA POINTS IS SUMMED OVER 40 POINTS FOR LONG-PERIOD DATA (320 POINTS FOR SHORT-PERIOD DATA) AND THIS VALUE IS PLOTTED, YIELDING ONE VALUE FOR EVERY 6 SEC OF DATA. CONSECUTIVE POINTS ARE PLOTTED WITH OPPOSITE POLARITY TO YIELD A LINE WITH THE APPEARANCE OF A SEISMOGRAM. COMPONENTS ARE ARRANGED LPX, LPY, LPZ, SPZ, WITH LPX AT THE TOP AND SPZ AT THE BOTTOM. TIME TICKS ARE DISPLAYED EVERY 10 MIN AND EACH HOUR (UT) IS LABELED. THE YEAR AND DAY ARE DISPLAYED EVERY 6 HRS. THE PLOTS ALSO CONTAIN THE VALUES FOR THE APOLLO 12, 15, AND 16 STATIONS FOR THE TIMES THEY ARE IN OPERATION, SIMULTANEOUSLY DISPLAYED ON THE ANALOG CHART. THESE PLOTS ARE USED TO IDENTIFY SEISMIC EVENTS AND TO DETERMINE THEIR START AND STOP TIMES.

DATA SET NAME- EXPANDED TIME SCALE PLAYOUTS OF LUNAR NSSDC ID 71-008C-04D  
SEISMIC DATA ON 35-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/07/71 TO 08/08/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE EXPANDED TIME SCALE PLAYOUTS THAT ARE TAKEN DIRECTLY FROM THE PASSIVE SEISMIC EXPERIMENT EVENT TAPES (DATA SET 71-008C-04A) AND ARE NOT PROCESSED IN ANY WAY (E.G., NO FILTERING, SMOOTHING, SIGNAL AVERAGING, ETC.). THE PLAYOUTS (USUALLY 10 MIN IN LENGTH) WERE GENERATED FOR ALL LONG PERIOD (15-SEC RESONANCE) SEISMIC EVENTS OBSERVED DURING THE PERIOD FEBRUARY 5, 1971 TO APRIL 21, 1972 WITH PEAK-TO-PEAK SIGNAL GROUND MOTION AMPLITUDES OF TWO OR MORE DIGITAL UNITS AND FOR SELECTED EVENTS PAST THAT TIME. THE ANNOTATION FORMAT CONSISTS OF YEAR (IN WHICH THE PLAYOUT BEGINS), SKIP X MAG (C) (WHERE SKIP EQUALS THE TAPE IDENTIFICATION NUMBER, MAG EQUALS A MULTIPLICATIVE FACTOR WHICH ADJUSTS THE SIGNAL AMPLITUDE OF AN EVENT FOR PLOTTING, C EQUALS THE LONG PERIOD COMPONENT WHERE X IS LPX, Y IS LPY, AND Z IS LPZ), THE DAY OF THE YEAR ON WHICH THE PLAYOUT BEGINS, AND HR, MIN, SEC WHICH IS THE UNIVERSAL TIME AT WHICH THE PLAYOUT BEGINS. TIME TICKS ARE PLACED AT 1-MIN INTERVALS. THESE TIME MARKS ARE NOT CORRECTED FOR POSSIBLE CLOCK ERRORS. NOTATIONS ON THE SEISMOGRAMS SUCH AS PHASE PICKS, (E.G., P, S,) EVENT CLASSIFICATION (E.G., A, B, C, M), ETC., ARE NOT PRIMARY DATA BUT INTERPRETATIONS OF THE DATA AND

SHOULD BE RECOGNIZED AND USED AS SUCH.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF LUNAR SEISMIC EVENTS ON 35-MM MICROFILM NSSDC ID 71-008C-04E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/06/71 TO 07/31/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35 MM MICROFILMED PLOTS OF SELECTED EVENTS, PRODUCED BY THE EXPERIMENTER FROM THE SEISMIC EVENT TAPES (DATA SET 71-008C-04A) AND THE ARTIFICIAL IMPACT EVENT TAPES (DATA SET 71-008C-04F) TO PROVIDE, IN COMPRESSED SCALE, A VISUAL DISPLAY OF THE CONTENTS OF EACH EVENT TAPE. THESE PLAYOUTS HAVE THE SAME FORMAT AS THE COMPRESSED SCALE PLAYOUTS (DATA SET 71-008C-04C) WITH THE EXCEPTIONS THAT TIME IS NOT CONTINUOUS AND THAT THE AMPLITUDE SCALE ON THE PLOT IS TWICE THAT OF THE COMPRESSED SCALE PLAYOUTS.

DATA SET NAME- ARTIFICIAL LUNAR IMPACT SEISMIC DATA ON MAGNETIC TAPE NSSDC ID 71-008C-04F

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/07/71 TO 12/16/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF RECORDED SEISMIC DATA OF IMPACTS ON THE MOON OF MAN-MADE ORIGIN, ON MAGNETIC TAPE. THE TAPES ARE IDENTICAL IN FORMAT TO THE SEISMIC EVENT TAPES (DATA SET 71-008C-04B). COMPRESSED SCALE PLAYOUTS OF THESE ARTIFICIAL IMPACT EVENTS ARE AVAILABLE IN DATA SET 71-008C-04C.

DATA SET NAME- SEISMIC EVENT LOG AS CARD IMAGES ON MAGNETIC TAPE NSSDC ID 71-008C-04G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/07/71 TO 04/21/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG IDENTIFYING ALL SEISMIC EVENTS OBSERVED ON THE LONG PERIOD COMPONENTS OF THE LUNAR SEISMIC NETWORK. IT IS TAPE GENERATED FROM IBM CARDS SUPPLIED BY THE EXPERIMENTER. EVENTS ARE PRESENTED IN CHRONOLOGICAL ORDER WITH THE FOLLOWING PARAMETERS LISTED -- YEAR, DAY OF THE YEAR, EVENT START AND STOP TIMES (UT), MAXIMUM SIGNAL GROUND MOTION AMPLITUDES, PLAYOUT, QUALITY, AND TYPE OR CLASS. A STOP TIME OF '0000' IMPLIES THAT THE EVENT OVERLAPS THE NEXT EVENT. THE GROUND MOTION AMPLITUDES GIVEN ARE FOR THE VERTICAL AXIS. AMPLITUDES WERE PICKED FROM THE COMPRESSED SCALE PLAYOUTS (DATA SET 71-008C-04C). AMPLITUDES ARE IN



MILLIMETERS PICKED ON RECORDS PLOTTED AT A SCALE OF 400 DIGITAL UNITS PER INCH. A '1' IN THE PLAYOUT COLUMN IMPLIES THAT AN EXPANDED SCALE PLAYOUT (DATA SET 71-008C-04D) IS AVAILABLE FOR THAT EVENT. A QUALITY FACTOR IS ASSIGNED WHENEVER THE RECORD FOR AN EVENT IS OTHER THAN NORMAL. PRIORITY IS GIVEN TO THE SMALLEST APPROPRIATE NUMBER -- (1) NO DATA AT THE TIME THE EVENT OCCURRED, (2) CLOCK RATE ERROR, (3) NOISY RECORD, AND (4) RECORD MASKED BY ANOTHER EVENT. THE EVENT TYPE IS AN INTERPRETATION OF THE POSSIBLE ORIGIN OF THE EVENT WHERE (A) IS A CLASSIFIED MOONQUAKE, (M) IS A SUSPECTED MOONQUAKE, (C) IS A SUSPECTED METEOROID IMPACT, (Z) IS MOSTLY SHORT PERIOD, (X) IS AN UNUSUAL EVENT, (L) IS AN LM IMPACT, AND (S) IS A SATURN IV-B IMPACT. THE EVENT CLASS GIVES THE CLASSIFICATION NUMBER FOR TYPE A EVENTS. ALL EVENTS IN THE SAME CLASS HAVE MATCHING WAVEFORMS. THE DATA ARE WRITTEN AT 556 DPI, BCD, 7-TRACK, ON AN IBM 7094 COMPUTER.

\*\*\*\*\*APOLLO 14 LM/ALSEP, MITCHELL

EXPERIMENT NAME- SOIL MECHANICS

NSSDC ID 71-008C-02

ORIGINAL EXPERIMENT INSTITUTION- U OF CALIFORNIA, BERK

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - J.K.	MITCHELL	U OF CALIFORNIA, BERK	BERKELEY, CA
DI - D.	CARRIER	NASA-JSC	HOUSTON, TX
DI - N.	COSTES	NASA-MSFC	HUNTSVILLE, AL
DI - L.G.	BROMWELL	MIT	BOSTON, MA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST EXPERIMENT DATA RECORDED- 02/06/71

#### EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO OBTAIN DATA ON THE COMPOSITION, TEXTURE, MECHANICAL PROPERTIES, AND VARIATION OF LUNAR SOILS. THESE DATA WILL BE USED TO FORMULATE, VERIFY, OR MODIFY THEORIES OF LUNAR HISTORY AND PROCESSES. OF PARTICULAR IMPORTANCE ARE THE CHARACTERISTICS OF PARTICLE SIZE, SHAPE, DISTRIBUTION, DENSITY, STRENGTH, AND COMPRESSIBILITY. DATA WERE OBTAINED THROUGH PHOTOGRAPHY, OBSERVATION BY THE ASTRONAUTS, AND EXAMINATION OF RETURNED SAMPLES.

DATA SET NAME- SOIL MECHANICS PASSIVE DATA IN PUBLISHED DOCUMENT NSSDC ID 71-008C-02A

AVAILABILITY OF DATA SET- DATA IN PUBLISHED REPORT(S)

TIME PERIOD COVERED- 02/05/71 TO 02/06/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 BOOK(S) OR BOUND VOLUME(S)

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE PUBLISHED REPORT OF THE MECHANICAL PROPERTIES OF LUNAR SOIL BY J. K. MITCHELL, L. G. BROMWELL, W. D. CARRIER, III, N. C. COSTES, AND R. F. SCOTT, CONTAINED IN THE APOLLO 14 PRELIMINARY SCIENCE REPORT, NASA SP-272, PP 87-109. CORE TUBE PENETRATIONS, MEASUREMENTS WITH THE APOLLO SAMPLE PENETROMETER (ASP), AND ANALYSIS OF THE INTERACTION BETWEEN THE MODULARIZED EQUIPMENT TRANSPORTER (MET) AND THE LUNAR SURFACE WERE USEFUL IN ESTIMATING SOIL PROPERTIES AND, IN CONJUNCTION WITH OBSERVATIONS AT THE SOIL MECHANICS TRENCH, ESTABLISHED THAT THE LUNAR

SURFACE SOIL STRENGTH INCREASES WITH DEPTH. THIS REPORT DERIVES LUNAR SOIL PROPERTIES BASED ON ESTIMATES OF PENETRATION AND FORCE. IT RELIES HEAVILY ON OBSERVATIONAL DATA PROVIDED BY PHOTOGRAPHY, ASTRONAUT COMMENTARY, AND EXAMINATION OF RETURNED LUNAR SAMPLES. ANALYSIS AT THE APOLLO 14 SITE SHOWED THERE WAS A GREATER VARIATION IN SOIL CHARACTERISTICS Laterally AND IN DEPTH THAN AT PREVIOUS SITES. COARSER MATERIAL AS WELL AS THE UNIVERSAL FINE, GRAY, SILTY MATERIAL WAS FOUND AT DEPTHS OF ONLY A FEW CENTIMETERS. THE MET PROVIDED FURTHER INFORMATION ON THE BEHAVIOR OF LUNAR SOILS. THE FRICTION ANGLE WAS FOUND TO BE 37 DEG, AND THE BULK DENSITY WAS 1.87 GRAMS/CC ON LEVEL TERRAIN AND 1.79 GRAMS/CC ON CRATER RIM SOFT SPOTS.

\*\*\*\*\*APOLLO 14 LM/ALSEP, SWANN

EXPERIMENT NAME- LUNAR FIELD GEOLOGY

NSSDC ID 71-008C-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.	SWANN	US GEOLOGICAL SURVEY	MENLO PARK, CA
OI - J.	MUEHLBERGER	NASA-JSC	HOUSTON, TX

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 02/06/71

#### EXPERIMENT BRIEF DESCRIPTION

THE LUNAR SURFACE FIELD GEOLOGY EXPERIMENT WAS DESIGNED TO GATHER DATA FOR USE IN INTERPRETING GEOLOGICAL HISTORY OF THE FRA MAURO LANDING SITE, INCLUDING THE NATURE OF THE ORIGIN OF THE DEBRIS LAYER OR REGOLITH AND THE LAND FORMS SUPERIMPOSED AT LATER DATES ON THE MARIA AND HIGHLANDS. THE LUNAR BEDROCK AND OTHER TYPES OF MATERIALS FOUND AT THIS SITE WERE COLLECTED TO YIELD AN INSIGHT INTO THE INTERNAL PROCESSES OF THE MOON'S FORMATION. ONE LARGE ROCK, SEVERAL SMALLER FRAGMENTS, AND FINE-GRAINED MATERIAL TYPICAL OF THE FRA MAURO SITE WERE COLLECTED DURING THE FIRST EXTRA VEHICULAR ACTIVITY (EVA) TO ENSURE THE RETURN OF SAMPLES IN THE EVENT THAT EVA 2 HAD TO BE CANCELLED. THE SELECTED SAMPLES WERE STOWED IN SAMPLE RETURN CONTAINER NO. 1 AND TAKEN INTO THE LM AT THE END OF EVA 1. IN ADDITION TO THE SAMPLES GATHERED DURING THE TWO EVA PERIODS AND RETURNED TO EARTH FOR ANALYSIS, SUBJECTIVE CREW COMMENTS IN REAL TIME AND PHOTOGRAPHS (BOTH STEREO AND REGULAR COLOR), AND POSTFLIGHT CREW DEBRIEFING WERE PRIMARY MEANS OF DATA GATHERING. SPECIFIC TYPES OF LUNAR SURFACE SAMPLES COLLECTED DURING THE FIELD GEOLOGY TRAVERSE INCLUDED SIX CORE-TUBE SOIL SAMPLES, A LUNAR ENVIRONMENT (FROM BENEATH THE SURFACE) SOIL SAMPLE, AND A SAMPLE OF EXHAUST CONTAMINATED SOIL FROM BENEATH THE LM. THE TOOLS USED WERE EXTENSION HANDLE SCOOPS, TONGS, A CORE TUBE BORER, AND A HAMMER. A TOTAL OF 36 KG OF SAMPLES WAS RETURNED IN FEBRUARY 1971.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 71-008C-01G  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/03/71 TO 02/04/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE FOR ALL APOLLO MISSIONS. THE DATA BASE IS MAINTAINED BY THE CURATOR'S OFFICE AT NASA JOHNSON SPACE CENTER (JSC). THIS VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) A BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS, CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY, WITH AUTHOR INDEX MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE TN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE ANALYZED PROPERTY, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC. (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER, THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY. THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER, THE ENTRIES ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON  
MICROFICHE

NSSDC ID 71-008C-01H

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/04/71 TO 02/06/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 3 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF -- (A) DESCRIPTIVE TEXT AND (B) PHOTOGRAPHIC CATALOG OF LUNAR SAMPLES FROM THE APOLLO 14 MISSION. THE DESCRIPTIVE TEXT, BY SAMPLE NO., GIVES DIMENSIONS, SHAPE, COLOR, TEXTURE, SURFACE FEATURES, COHERENCE, CAVITIES, GRAIN SIZE, HOMOGENEITY, MINERALOGIC DESCRIPTION, ROCK CLASSIFICATION, AND OUTSTANDING FEATURES. THE PHOTOGRAPHIC CATALOG GIVES -- (1) SUMMARY OF ROCK SAMPLE NUMBER AND CORRESPONDING PHOTOGRAPHIC FRAME NUMBER, (2) THIN SECTION SAMPLE SUMMARY BY SAMPLE NO. AND FRAME NO., (3) INVENTORY OF SAMPLES, (4) ROCKS AND ALLOCATED CHIPS SUMMARY BY SAMPLE NO., AND (5) PHOTOGRAPHS OF THE SAMPLES IN THE LABORATORY. AT THE END IS A PHOTOGRAPH INDEX BY SAMPLE NO.

\*\*\*\*\*APOLLO 15 CSM

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SPACECRAFT COMMON NAME- APOLLO 15 CSM

NSSDC ID 71-063A

ALTERNATE NAMES- 05351

LAUNCH DATE- 07/26/71 SPACECRAFT WEIGHT IN ORBIT- 57760. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 08/07/71

EPOCH DATE- 07/31/71 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 118.8 MIN  
APOAPSIS- 120. KM ALT PERIAPSIS- 93. KM ALT INCLINATION- 26. DEG

#### SPACECRAFT BRIEF DESCRIPTION

APOLLO 15 WAS THE FIFTH SPACECRAFT (FOURTH ACCOMPLISHED) AND THE FIRST OF THE J-SERIES APOLLO MISSIONS DESIGNED TO LAND MEN ON THE MOON. THE LUNAR LANDING SITE FOR THE 12-DAY SCIENTIFIC MISSION WAS THE HADLEY RILLE-APENNINE MOUNTAIN REGION AT 26 DEG 06 MIN 54 SEC N, 3 DEG 39 MIN, 30 SEC E ON THE LUNAR SURFACE. THE DATE OF LAUNCH WAS JULY 26, 1971. THE LUNAR MODULE (LM) CARRYING ASTRONAUTS DAVID SCOTT AND JAMES IRWIN AND THE LUNAR ROVING VEHICLE (LRV) LANDED ON THE MOON ON JULY 31, 1971. THE COMMAND MODULE (CM) PILOTTED BY ALFRED WORDEN REMAINED IN A SLIGHTLY ELLIPTICAL ORBIT AT AN ALTITUDE OF 93 BY 120 KM WITH AN INCLINATION OF 23 DEG. THE PROJECTS CARRIED OUT ON THE SURFACE INCLUDED THE DEPLOYMENT OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), GEOLOGICAL FIELD EXPLORATION IN THREE EVA EXCURSIONS, DOCUMENTING PHOTOGRAPHY, AND ACQUISITION OF SAMPLES OF THE LUNAR TERRAIN. PHOTOGRAPHS USING 16- AND 70-MM FILM WERE OBTAINED FROM BOTH THE SURFACE AND FROM ORBIT. AND 35-MM AND TWO KINDS OF 5-IN. FILM PHOTOGRAPHS WERE OBTAINED FROM ORBIT. SPECIAL UV AND DIMLIGHT PHOTOGRAPHIC EXPERIMENTS WERE PERFORMED DURING ORBIT. BEFORE LEAVING THE LUNAR ENVIRONMENT, A SUBSATELLITE WITH AN EXPERIMENTS PACKAGE WAS RELEASED FROM THE COMMAND SERVICE MODULE (CSM) ON AUGUST 4, 1971, INTO AN ORBIT 135 BY 97 KM. THE LRV WAS USED TO EXPLORE REGIONS WITHIN 5 KM OF THE LM LANDING SITE. THIS WAS THE FIRST TIME A VEHICLE OF THIS TYPE HAD BEEN USED, AND ITS PERFORMANCE ON THE LUNAR TERRAIN WAS VERY SUCCESSFUL. THE CM AND LM VEHICLES REJOINED ON AUGUST 2, 1971, PERFORMED FURTHER PHOTOGRAPHIC EXPERIMENTS IN ORBIT AROUND THE MOON FOR TWO DAYS. THE LM WAS SEPARATED FOR LUNAR IMPACT AND THE CSM WAS PLACED IN EARTHBOUND TRAJECTORY. ENROUTE THE SM WAS SEPARATED AND THE CM RETURNED TO EARTH ON AUGUST 7, 1971. MORE INFORMATION ON THE LM MAY BE FOUND UNDER SPACECRAFT 71-063C.

#### \*\*\*\*\*APOLLO 15 CSM, DOYLE

EXPERIMENT NAME- HANDHELD PHOTOGRAPHY NSSDC ID 71-063A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/07/71

#### EXPERIMENT BRIEF DESCRIPTION

THE PHOTOGRAPHIC EQUIPMENT FOR APOLLO 15 INCLUDED HASSELBLAD AND MAURER CAMERAS THAT WERE USED (1) TO OBTAIN PHOTOGRAPHS OF THE TRANSPOSITION, DOCKING, LUNAR MODULE EJECTION MANEUVER, AND LM RENDEZVOUS SEQUENCE FROM BOTH THE COMMAND AND LUNAR MODULES, (2) TO OBTAIN PHOTOS OF THE LUNAR GROUND TRACK AND OF FUTURE LANDING SITES, (3) TO RECORD THE OPERATIONAL ACTIVITIES OF THE CREW, (4) TO OBTAIN LONG-DISTANCE EARTH AND LUNAR PHOTOGRAPHS FOR AREAS OF SCIENTIFIC INTEREST, AND (5) TO OBTAIN PHOTOS

OF LUNAR SURFACE FEATURES AND OF THE ACTIVITIES OF THE ASTRONAUTS AFTER THEIR LANDING ON THE MOON. THE CAMERA EQUIPMENT CONSISTED OF ONE 70-MM HASSELBLAD ELECTRIC CAMERA, TWO HASSELBLAD DATA CAMERAS, TWO 16-MM MAURER DATA ACQUISITION CAMERAS, AND TWO TV CAMERAS. VARIOUS LENSES WERE USED WITH THESE CAMERAS FOR SPECIFIC TYPES OF PHOTOGRAPHY.

DATA SET NAME- CAL TECH MICROFICHE OF HASSELBLAD 70-MM PHOTOGRAPHY ON 4- X 6-IN. B/W FILM CARDS NSSDC ID 71-063A-01J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/26/71 TO 08/07/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 40 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CONTAINING THE COMPLETE SET OF 70-MM HASSELBLAD PHOTOGRAPHY TAKEN ON THE APOLLO 15 MISSION. THESE MICROFICHE WERE REPRODUCED BY CAL TECH FOR CATALOG PURPOSES. HOWEVER, MANY FRAMES DO NOT SHOW THE FRAME NUMBER, OR NUMBERS ARE ILLEGIBLE. THEREFORE, THIS DATA SET IS NOT SUITABLE FOR CATALOG USE. THE PHOTOGRAPHIC QUALITY OF THIS MICROFICHE HOWEVER IS GOOD ENOUGH FOR SOME SCIENTIFIC USES, ESPECIALLY IN CONJUNCTION WITH AUTOMATIC MICROFICHE RETRIEVAL SYSTEMS. NSSDC HAS FILMED ITS OWN MICROFICHE CATALOG (DATA SET 71-063A-01M) THAT CAN BE USED BY REQUESTERS EITHER FOR CATALOG OR FOR SOME PHOTOGRAPHIC STUDY PURPOSES.

DATA SET NAME- COMPLETE NIKON CAMERA DIMLIGHT PHOTOGRAPHY ON 35-MM FILM NSSDC ID 71-063A-01P

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 07/27/71 TO 08/07/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 125 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF ALL THE DIMLIGHT PHOTOGRAPHY FROM THE APOLLO 15 MISSION. THE MILKY WAY, EARTHSHINE AREAS ON THE MOON, AND SPACECRAFT ENVIRONMENT APPEAR ON THE IMAGERY. THE QUALITY IS FAIR TO GOOD.

DATA SET NAME- INDEX TO 35-MM NIKON CAMERA PHOTOGRAPHY ON 16-MM FILM NSSDC ID 71-063A-01Q

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 07/27/71 TO 08/07/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONTAINS THE INDEX TO THE 35-MM NIKON CAMERA PHOTOGRAPHY, AND IS ON 16-MM MICROFILM. THE INDEX CONTAINS THE FOLLOWING INFORMATION -- (1) A QUICK-LOOK FRAME NUMBER, (2) A NASA FRAME NUMBER, (3) THE SUBJECT, (4) THE DATE OF EXPOSURE, (5) THE TIME (GMT) OF EXPOSURE, (6) THE LENGTH OF EXPOSURE TIME, (7) THE CENTER POINT RIGHT ASCENSION, (8) THE

CENTER POINT DECLINATION COORDINATES (FOR ASTRONOMICAL SUBJECTS), (9) THE CORNER COORDINATES - RIGHT ASCENSION, (10) THE CORNER COORDINATES - DECLINATION (FOR ASTRONOMICAL SUBJECTS), AND (11) REMARKS. THIS DATA SET IS CONTAINED ON THE SAME ROLL WITH THE HASSELBLAD, MAURER, KINESCOPE, MAPPING AND PANORAMIC CAMERA INDEXES.

DATA SET NAME- HASSELBLAD CAMERA PHOTOGRAPHY INDEX ON MICROFICHE NSSDC ID 71-063A-01R

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/26/71 TO 08/07/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 6 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE 70-MM HASSELBLAD PHOTOGRAPHY INDEX, REPRODUCED ON MICROFICHE. THE INDEX CONTAINS SUCH PARAMETERS AS FRAME NUMBERS, MISSION ACTIVITY (WHICH INCLUDES REVOLUTION NUMBER FOR ORBITAL PHOTOGRAPHY), LENS, ATTITUDE, PRINCIPAL POINT LATITUDES AND LONGITUDES, CAMERA TILT AND AZIMUTH, SUN ELEVATION, AND DESCRIPTION. AT THE TOP OF EACH PAGE, THE MAGAZINE DESIGNATIONS AND FILM TYPE ARE GIVEN. THE PHOTOGRAPHS ARE INDEXED BY FRAME NUMBER, BY LONGITUDE IN 10-DEG INCREMENTS, AND BY SURFACE ACTIVITY. THIS INDEX ALSO GIVES SUMMARY TABLES.

\*\*\*\*\*APOLLO 15 CSM, DOYLE

EXPERIMENT NAME- PANORAMIC PHOTOGRAPHY NSSDC ID 71-063A-02

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/03/71

#### EXPERIMENT BRIEF DESCRIPTION

THE SCIENTIFIC INSTRUMENT MODULE (SIM) ITEK PANORAMIC CAMERA EXPERIMENT WAS DESIGNED TO OBTAIN HIGH-RESOLUTION PANORAMIC PHOTOGRAPHS WITH STEREOSCOPIC AND MONOSCOPIC COVERAGE OF THE LUNAR SURFACE. THE PANORAMIC CAMERA, WHICH WAS HOUSED IN THE COMMAND SERVICE MODULE (CSM) AND SCANNED THE LUNAR SURFACE FROM LUNAR ORBIT, ALSO PROVIDED SUPPORTING PHOTOGRAPHIC DATA FOR THE OTHER CSM CAMERAS AND EXPERIMENTS. THE CAMERA PROVIDED PHOTOGRAPHS OF 1- TO 2-M RESOLUTION FROM AN ORBITAL ALTITUDE OF 111 KM. THE RANGES FOR THIS CAMERA WERE (1) FOCAL LENGTH, 24 IN., (2) FIELD OF VIEW, 108-DEG CROSS-TRACK BY 10.4 DEG ALONG THE TRACK SCANNED, (3) IMAGE COVERAGE (FROM 111 KM ALTITUDE) 337 KM BY 21.6 KM, (4) IMAGE SIZE, 45.24 IN. BY 4.5 IN., AND (5) FILM CAPACITY, 6500 FT FOR 1600 FRAMES. THE PANORAMIC CAMERA WAS COMPOSED OF FOUR MAIN COMPONENTS -- (1) A ROLL FRAME ASSEMBLY THAT ROTATED CONTINUOUSLY IN THE CROSS-TRACK SCAN DIRECTION DURING CAMERA OPERATION (PANORAMIC SCANNING), (2) A GIMBAL ASSEMBLY THAT TILTED FORE AND AFT TO PROVIDE STEREO COVERAGE AS WELL AS FORWARD MOTION COMPENSATION, (3) THE MAIN FRAME, AND (4) A GASEOUS NITROGEN PRESSURE VESSEL ASSEMBLY REQUIRED FOR CERTAIN FILM ROLLER GAS BEARINGS. THE PRESSURE VESSEL ASSEMBLY ALSO WAS USED BY THE FAIRCHILD MAPPING CAMERA EXPERIMENT (APOLLO 15A-03). THE CAMERA

OPTICS SYSTEM, A CAMERA/FILM DRIVE AND CONTROL SYSTEM, AND A FILM CASSETTE COMPLETED THE PANORAMIC CAMERA SYSTEM. THE FILM CASSETTE WAS RETRIEVED BY A CREWMAN DURING EXTRAVEHICULAR ACTIVITY (EVA) IN THE TRANSEARTH PORTION OF THE MISSION. THE PANORAMIC CAMERA WAS MOUNTED ON STRUCTURAL BEAMS IN THE CSM SIM BAY BETWEEN THE TWO SIM SHELVES. IT WAS DESIGNED TO OPERATE IN ITS SIM-INSTALLED POSITION WITHOUT THE USE OF A DEPLOYMENT SUBSYSTEM. THE CAMERA LENS WAS STOWED FACE-INWARD TO THE SIM TO PROTECT IT FROM CSM CONTAMINATION SOURCES. THE CAMERA AUTOMATICALLY STOWED ITS LENS WHEN OFF-NOMINAL LENS THERMAL CONDITIONS WERE EXPERIENCED. COMMAND MODULE CAMERA CONTROLS WERE AVAILABLE FOR THE CREW (1) TO ACTIVATE AND DEACTIVATE CAMERA HEATERS, (2) TO SUPPLY OR REMOVE PRIMARY CAMERA POWER, (3) TO SELECT AN OPERATE OR STANDBY OPERATION MODE, (4) TO SUPPLY FILM ROLLER TORQUE TO PREVENT FILM SLACK DURING THE LAUNCH, TRANSLUNAR INJECTION, AND SERVICE PROPULSION SYSTEM POWERED FLIGHT PHASES, (5) TO ACTIVATE THE FIVE-FILM FRAME ADVANCE CYCLE REQUIRED DAILY (IF CAMERA WAS NOT OPERATED IN A 24-HR PERIOD) TO PREVENT FILM SET AFTER FILM LOADING, (6) TO INCREASE OR DECREASE THE WIDTH OF THE CAMERA EXPOSURE SLIT, AND (7) TO SELECT A STEREOSCOPIC OR MONOSCOPIC MODE OF OPERATION. A CM DISPLAY OF THE BARBER POLE/GRAY TALKBACK TYPE WAS PROVIDED TO ENABLE THE CREW TO VERIFY CAMERA OPERATIONAL STATUS. OVER 1500 USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- NSSDC PANORAMIC CAMERA PHOTOGRAPHY INDEX NSSDC ID 71-063A-02H  
ON MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 07/31/71 TO 08/03/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 4 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, GENERATED AT NSSDC FROM HARDCOPY, CONSISTS OF MICROFICHE CONTAINING THE COMPLETE INDEX OF THE APOLLO 15 PANORAMIC CAMERA PHOTOGRAPHY. DATA INCLUDED IN THE INDEX ARE -- FRAME NUMBER, CAMERA LOOK DIRECTION, STEREO COMPANION FRAME NUMBER, LATITUDE AND LONGITUDE OF THE PRINCIPAL POINT OF THE PHOTOGRAPH IN DEGREES, SPACECRAFT ALTITUDE IN KM, REVOLUTION NUMBER, SUN ELEVATION IN DEGREES, AND A BRIEF DESCRIPTION WHICH IDENTIFIES SOME FEATURES IN THE FIELD OF VIEW.

\*\*\*\*\*APOLLO 15 CSM, DOYLE

EXPERIMENT NAME- METRIC PHOTOGRAPHY NSSDC ID 71-063A-03

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/03/71

#### EXPERIMENT BRIEF DESCRIPTION

THE FAIRCHILD MAPPING CAMERA EXPERIMENT WAS DESIGNED TO OBTAIN HIGH-QUALITY METRIC PHOTOGRAPHS OF THE LUNAR SURFACE AND STELLAR PHOTOGRAPHS EXPOSED SIMULTANEOUSLY WITH THE METRIC PHOTOGRAPHS. THE METRIC PHOTOGRAPHS WERE OBTAINED USING A 3-IN. (76 MM) CARTOGRAPHIC LENS, AND PHOTOGRAPHS OF

THE STAR FIELD WERE OBTAINED USING A 35-MM STELLAR CAMERA LENS. THE MAPPING CAMERA ALSO PROVIDED SUPPORTING PHOTOGRAPHIC DATA FOR THE SCIENTIFIC INSTRUMENT MODULE (SIM) PANORAMIC CAMERA AND FOR OTHER COMMAND SERVICE MODULE (CSM) PHOTOGRAPHIC EXPERIMENTS. THE CAMERA SCANNED THE LUNAR SURFACE FROM THE CSM DURING LUNAR ORBIT. THE STELLAR CAMERA WAS OPERATED ON THE LUNAR DARK-SIDE IN CONJUNCTION WITH A LASER ALTIMETER AS THE FILM BUDGET PERMITTED. THE TIME-CORRELATED STELLAR PHOTOGRAPHS WERE USED TO PROVIDE A REFERENCE FOR THE DETERMINATION OF THE LASER ALTIMETER POINTING VECTOR AND FOR THE CARTOGRAPHIC LENS POINTING VECTOR FOR METRIC CAMERA LIGHT-SIDE PHOTOGRAPHY. THE METRIC CAMERA PROVIDED 20-M RESOLUTION PHOTOGRAPHY FROM AN ORBITAL ALTITUDE OF 111 KM. THE RANGES FOR THE METRIC CAMERA WERE (1) FOCAL LENGTH, 3 IN. (76 MM), (2) FIELD OF VIEW, 74 DEG BY 74 DEG, (3) IMAGE COVERAGE (FROM 111.12 KM) A 166 KM SQ AREA, (4) IMAGE SIZE, 4.5 BY 4.5 IN., AND (5) FILM CAPACITY, 1500 FT OF 5-IN. FILM TOTALING 2100 FRAMES (OF A MAXIMUM POSSIBLE 3500 FRAMES). THE MAPPING CAMERA SYSTEM WAS COMPOSED OF TWO INDIVIDUAL CAMERA SUBSYSTEMS -- THE METRIC (TERRAIN MAPPING) CAMERA, WHICH PERFORMED THE CARTOGRAPHIC FUNCTION, AND THE STELLAR CAMERA. THESE SUBSYSTEMS WERE INTEGRATED INTO A SINGLE UNIT THAT HAD THE OPTICAL AXIS RELATIONSHIP NECESSARY TO SATISFY THE PRECISION MAPPING CAMERA AND THE LASER ALTIMETER ATTITUDE (POINTING) DETERMINATION REQUIREMENT. THIS SYSTEM SHARED A GASEOUS NITROGEN PRESSURE VESSEL ASSEMBLY WITH THE SIM PANORAMIC CAMERA TO PROVIDE AN INERT AND PRESSURIZED ATMOSPHERE WITHIN THE CAMERA. THE CAMERA OPTICS SYSTEM, FILM DRIVE/EXPOSURE/TAKEUP SYSTEM, AND A REMOVABLE CASSETTE (CONTAINING BOTH METRIC AND STELLAR CAMERA FILM) COMPLETED THE CAMERA SYSTEM. THE FILM CASSETTE WAS RETRIEVED BY A CREWMAN DURING EVA AFTER PHOTOGRAPHIC OPERATIONS WERE COMPLETED. THE MAPPING CAMERA SYSTEM WAS MOUNTED ON THE TOP SHELF IN THE CSM SIM BAY AND WAS DEPLOYED ON A RAIL-TYPE MECHANISM IN ORDER TO PROVIDE AN UNOBSTRUCTED FIELD OF VIEW FOR THE STELLAR CAMERA. (THIS MECHANISM ENSURED THAT THE STAR FIELD PHOTOGRAPHED WAS NOT OBSCURED BY EITHER THE LUNAR HORIZON OR THE SIM MOLD LINE.) A COVER ATTACHED TO THE SIM SHELF PROTECTED THE METRIC CAMERA LENS AND LASER ALTIMETER OPTICS FROM SPACECRAFT CONTAMINATION SOURCES DURING REACTION CONTROL SYSTEM FIRINGS AND EFFLUENT DUMPS. THIS COVER PROVIDED FOR MULTIPLE OPENING AND CLOSING CYCLES. CAMERA CONTROLS IN THE COMMAND MODULE ALLOWED THE CREW TO ACTIVATE OR DEACTIVATE CAMERA HEATERS AND CAMERA FUNCTIONS, TO ACTIVATE OR DEACTIVATE THE IMAGE MOTION COMPENSATION SWITCH AND INCREMENT THE CAMERA VELOCITY-TO-HEIGHT CONTROL SIGNAL (FIVE INCREMENTAL STEPS WERE POSSIBLE BEFORE RECYCLING), AND TO ACTIVATE AND EXTEND OR RETRACT THE CAMERA SYSTEM ON ITS DEPLOYMENT RAILS. OVER 2000 USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- CALTECH MICROFICHE OF METRIC PHOTOGRAPHY    NSSDC ID 71-063A-03F  
ON 4- X 6-IN. B/W FILM CARDS

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/71 TO 08/03/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET-    45 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CONTAINING THE COMPLETE SET OF THE MAPPING (METRIC) CAMERA PHOTOGRAPHY FROM THE APOLLO 15 MISSION PRODUCED BY CAL TECH FOR CATALOG PURPOSES. ALTHOUGH THE PHOTOGRAPHY IS VERY GOOD AND USEFUL FOR SOME SCIENTIFIC ANALYSES, THE REGISTRY FOR FRAME NUMBERS SLIPPED AT TIMES AND MANY OF THE PHOTOS HAVE ILLEGIBLE NUMBERS. THEREFORE, THIS DATA SET CANNOT BE USED FOR CATALOG PURPOSES. NSSDC HAS REPRODUCED MICROFICHE OF THE MAPPING CAMERA PHOTOGRAPHY (71-063A-03H) THAT CAN BE USED BY REQUESTERS EITHER FOR CATALOG OR FOR SOME PHOTOGRAPHIC STUDY PURPOSES. THE CAL TECH MICROFICHE ARE PARTICULARLY USEFUL IN CONJUNCTION WITH AUTOMATED MICROFICHE



RETRIEVAL SYSTEMS.

DATA SET NAME- NSSDC METRIC CAMERA PHOTOGRAPHY INDEX ON NSSDC ID 71-063A-031  
B/W MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 07/31/71 TO 08/03/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 4 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS PREPARED AT NSSDC THAT CONTAIN THE COMPLETE INDEX TO THE MAPPING (METRIC) CAMERA PHOTOGRAPHY FROM THE APOLLO 15 MISSION. DATA INCLUDED IN THE INDEX ARE -- FRAME NUMBER, REVOLUTION NUMBER, SPACECRAFT ALTITUDE IN KM, LATITUDE AND LONGITUDE IN DEG OF THE PRINCIPAL POINT OF THE PHOTOGRAPH, CAMERA TILT AND AZIMUTH, PERCENT OF FORWARD OVERLAP, SUN'S ELEVATION IN DEG, AND A DESCRIPTION WHICH INCLUDES PRINCIPAL FEATURES OR AREA FOUND IN THE PHOTOGRAPH.

\*\*\*\*\*APOLLO 15 CSM, HOWARD

EXPERIMENT NAME- BISTATIC RADAR

NSSDC ID 71-063A-14

ORIGINAL EXPERIMENT INSTITUTION- STANFORD U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - H.T.	HOWARD	STANFORD U	STANFORD, CA
OI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - A.M.	PETERSON	STANFORD U	STANFORD, CA
OI - G.L.	TYLER	STANFORD U	STANFORD, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST EXPERIMENT DATA RECORDED- 08/03/71

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CARRIED ON BOARD THE APOLLO 15 MISSION, UTILIZED THE S-BAND (13-CM) AND VERY HIGH FREQUENCY (VHF, 116-CM) TRANSMITTERS ON THE COMMAND AND SERVICE MODULE (CSM). THE CSM WAS ORIENTED TO DIRECT THE TRANSMISSIONS TO AN AREA ABOUT 10 KM IN DIAM ON THE LUNAR SURFACE. THE RADIO SIGNALS REFLECTED FROM THE LUNAR SURFACE WERE RECEIVED AT THE EARTH IN A MANNER THAT PRESERVED THE FREQUENCY, PHASE, POLARIZATION, AND AMPLITUDE INFORMATION. DIFFERENCES BETWEEN THE KNOWN CHARACTERISTICS OF THE TRANSMITTED SIGNALS AND THE CHARACTERISTICS OF THE ECHOES FROM THE LUNAR SURFACE WERE USED IN CONJUNCTION WITH SCATTERING THEORY TO DERIVE QUANTITATIVE INFERENCES ABOUT THE MOON. THE LUNAR PROPERTIES INFERRED WERE THE DIELECTRIC CONSTANT, THE AVERAGE SLOPE AND SLOPE PROBABILITY, DENSITY, SMALL-SCALE SURFACE ROUGHNESS, AND EMBEDDED ROCKS TO A DEPTH OF 20 M.

DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 13-CM NSSDC ID 71-063A-14A  
BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/01/71 TO 08/01/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 13-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI, BINARY MAGNETIC TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES -- A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH, THE FIRST FIVE RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX, J. RECORD 1 CONTAINS  $J_{11}(K)$ , RECORD 2 CONTAINS  $J_{22}(K)$ , RECORD 3 CONTAINS THE REAL PART OF  $J_{12}(K)$ , RECORD 4 CONTAINS THE IMAGINARY PART OF  $J_{12}(K)$ , AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD 6 OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE, THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.

DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 116-CM NSSDC ID 71-063A-14B  
BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/01/71 TO 08/01/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 116-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI, BINARY MAGNETIC TAPE WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES -- A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH, THE FIRST FIVE

RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX. J. RECORD 1 CONTAINS J11(K), RECORD 2 CONTAINS J22(K), RECORD 3 CONTAINS THE REAL PART OF J12(K), RECORD 4 CONTAINS THE IMAGINARY PART OF J12(K), AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD 6 OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE, THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.

DATA SET NAME- ANALYZED 13-CM AND 116-CM BISTATIC RADAR NSSDC ID 71-063A-14C  
LUNAR OBSERVATIONS ON MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/01/71 TO 08/01/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO AS THE INTEGRAL TAPES BY THE EXPERIMENTER, IS A COMPLETE SET OF ANALYZED DATA RECORDS DERIVED FROM THE REDUCED DATA RECORDS (OR JM DOPTRACK TAPES, DATA SETS 71-063A-14A AND 71-063A-14B). THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI, BINARY TAPE WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THE DATA CONTAIN CERTAIN PROPERTIES OF THE REDUCED DATA AS WELL AS INFERRED PROPERTIES OF THE LUNAR SURFACE. EACH TAPE FILE IS COMPOSED OF ONE HEADER RECORD FOLLOWED BY MANY DATA RECORDS. EACH HEADER RECORD CONTAINS A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF DATA RECORDS FOLLOWING THE HEADER RECORD. DATA RECORDS LIST THE POLARIZED POWER, NORMALIZED POLARIZED POWER, UNPOLARIZED POWER, EQUIVALENT AREA BANDWIDTH, NORMALIZED ABSOLUTE MOMENT BANDWIDTH, NORMALIZED SECOND MOMENT BANDWIDTH, CENTROID OF THE ECHO SPECTRUM, RMS SLOPE INFERRED FROM EQUIVALENT AREA BANDWIDTH, HANDSCALED 1/2 POWER ECHO BANDWIDTH, A DATA VALIDITY FLAG, SPACECRAFT ANTENNA GAIN (OR ZERO), AND ALL THE EPHEMERIS AND ANCILLARY DATA CONTAINED ON DATA RECORD SIX IN EACH DATA FRAME OF THE REDUCED DATA TAPES (DATA SETS 71-063A-14A AND 71-063A-14B).

\*\*\*\*\*APOLLO 15 LM/ALSEP\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 15 LM/ALSEP NSSDC ID 71-063C  
ALTERNATE NAMES- APOLLO 15C, ALSEP 15, LEM 15, ROVER 15, 05366

LAUNCH DATE- 07/26/71 SPACECRAFT WEIGHT IN ORBIT- 12700. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

#### SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 15 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE MOON AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE NORTH CENTRAL PART OF THE MOON (26 DEG 4 MIN 54 SEC N LATITUDE, 3 DEG 39 MIN 30 SEC E LONGITUDE). AT THE FOOT OF THE APENNINE MOUNTAIN RANGE, THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING THE EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP CONTAINED SEISMIC, MAGNETIC FIELDS, LUNAR ATMOSPHERIC COMPOSITION, ION COMPOSITION, LUNAR DUST, SOLAR WIND COMPOSITION, HEAT LOSS, AND SOLAR CELL RADIATION DAMAGE EXPERIMENTS.

#### \*\*\*\*\*APOLLO 15 LM/ALSEP, FALLER

EXPERIMENT NAME- LASER RANGING RETROREFLECTOR NSSDC ID 71-063C-08

ORIGINAL EXPERIMENT INSTITUTION- WESLEYAN U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - J. FALLER WESLEYAN U MIDDLETOWN, CT

EXPERIMENT STATUS OF OPERATION- NORMAL

#### EXPERIMENT BRIEF DESCRIPTION

THE LASER RANGING RETROREFLECTOR EXPERIMENT (LRRR), PART OF THE ALSEP PACKAGE, WAS A CORNER REFLECTOR FOR LASER RANGING FROM EARTH. THE RANGING DATA OBTAINED INCLUDED INFORMATION ON LUNAR MOTION, LUNAR LIBRATIONS, AND EARTH ROTATION. THE LRRR EXPERIMENT CONSISTED OF A FOLDED PANEL STRUCTURE INCORPORATING 300 INDIVIDUAL FUSED-SILICA OPTICAL CORNER REFLECTORS, A SIMPLE ALIGNMENT/LEVELING DEVICE, AND AN AIM-HANDLE MECHANISM. THE LUNAR ROVING VEHICLE (LRV) WAS USED TO CARRY THE LRRR TO THE HADLEY RILL SITE. THE LRRR BECAME PASSIVE AFTER DEPLOYMENT. A HASSELBLAD ELECTRIC DATA CAMERA (60-MM LENS) WAS USED TO PHOTOGRAPH THE EXPERIMENT. THE LRRR CAN BE USED INDEFINITELY AND WILL PROVIDE DATA THAT, WHEN USED IN CONJUNCTION WITH DATA FROM THE APOLLO 11 AND 14 LRRR EXPERIMENTS, WILL PERMIT MORE REFINED DISTANCE MEASUREMENTS THAN WERE PREVIOUSLY AVAILABLE. NOW SMALLER TELESCOPES CAN BE USED THAN PREVIOUSLY WERE NEEDED, THUS PROVIDING MORE DATA AND INCREASING THE ACCURACY.

DATA SET NAME- FILTERED AND UNFILTERED PHOTON DETECTIONS N55DC ID 71-063C-08A  
ON MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/26/71 TO 06/26/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 3 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF EXPERIMENTER-SUPPLIED 800-BPI, BINARY 7-TRACK MAGNETIC TAPES CONTAINING DATA ON THE CURRENT DEPOSITION FROM THE APOLLO LUNAR LASER RANGING EXPERIMENT FROM APOLLO 11, 14, AND 15. THERE ARE TWO TYPES OF DATA - (1) FILTERED DATA AND (2) UNFILTERED DETECTIONS. THE

DATA WERE WRITTEN ORIGINALLY ON A CDC 6600 COMPUTER. THERE ARE TWO DIFFERENT KINDS OF DATA -- RUN DATA, WHICH ARE DESIGNATED BY A 'Z' IN THE BEGINNING OF EVERY 80-CHARACTER LOGICAL RECORD, AND SHOT DATA, WHICH ARE DESIGNATED BY A 'P' IN THE BEGINNING OF EVERY 80-CHARACTER LOGICAL RECORD. THE TAPE IS BLOCKED AT 64 LOGICAL RECORDS PER PHYSICAL RECORD. FILTERED DATA CONSIST OF PHOTON DETECTIONS SUBMITTED TO A DATA FILTERING PROCEDURE ASSUMING LINEARITY OF D-C RESIDUALS OVER A RELATIVELY SHORT TIME INTERVAL AND RELYING ON POISSON STATISTICS FOR THE LEVEL OF CONFIDENCE IN A COLLECTION IDENTIFIED BY THE FILTER. UNFILTERED DATA ARE REAL DATA, HEAVILY INTERSPERSED WITH NOISE PHOTONS FROM VARIOUS SOURCES OF STRAY LIGHT. ANY ATTEMPT TO USE THE DATA IN A SIMPLE GAUSSIAN APPLICATION WOULD RESULT IN A SOLUTION CLOSELY ADHERING TO THE PREDICTION EPHEMERIS USED TO CONTROL THE DETECTOR RANGE GRATING. SOME FILTERING PROCESS MUST BE APPLIED TO THE DATA FOR EFFECTIVE USE. THE RUN DATA RECORDED ARE JULIAN DATE, CLOCK ERROR, AMBIENT TEMPERATURE, AMBIENT RELATIVE HUMIDITY, PERCENTAGES OF SATURATION, AND WIND SPEED., THE SHOT DATA ARE LASER ENERGY IN JOULES (TIMES TEN), LASER FREQUENCY IN HZ TIMES 1 E 10, OBSERVATIONAL RESOLUTION, PHOTOMULTIPLIER DARK COUNT, (BACKGROUND) MOON COUNT RATE, STAR COUNT RATE, CALIBRATION STAR IDENTIFICATION, FILTER SPECTRAL WIDTH, NUMBER OF SHOTS FIRED THIS RUN, YEAR, MONTH, AND DAY.

\*\*\*\*\*APOLLO 15 LM/ALSEP, LATHAM

EXPERIMENT NAME- PASSIVE SEISMIC

NSDOC ID 71-063C-01

ORIGINAL EXPERIMENT INSTITUTION- LAMONT-DOHERTY GEO OBS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.V.	LATHAM	U OF TEXAS, GALVESTON	GALVESTON, TX
OI - W.M.	EWING	COLUMBIA U	NEW YORK, NY
OI - R.F.	PRESS	MIT	CAMBRIDGE, MA
OI - G.	SUTTON	U OF HAWAII	HONOLULU, HI

EXPERIMENT STATUS OF OPERATION- NORMAL

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE), PART OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), MEASURED SEISMIC SIGNALS FROM BOTH EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE MEASUREMENTS OBTAINED HAVE BEEN USED TO DETERMINE THE INTERNAL STRUCTURE OF THE MOON, THE RATE OF ENERGY RELEASE, AND THE NUMBERS AND MASSES OF METEORIDS IMPACTING THE LUNAR SURFACE. THE LUNAR SURFACE IMPACTS OF THE SPENT S-IVB AND LM ASCENT STAGES WERE USED AS EXTERNAL CALIBRATION SOURCES FOR THE SEISMOMETERS. THE KNOWN MASS AND VELOCITY OF THESE STAGES AT SURFACE IMPACT AND THE LUNAR IMPACT POINT COORDINATES ENABLED THE COMPUTATION OF ENERGY GENERATED AT IMPACT AND THE POINT OF ENERGY APPLICATION. (THE CALIBRATION CHARACTERISTICS WERE DETERMINED BY MEASURING SEISMOMETER RESPONSE TO THESE ENERGY SOURCES.) THE EXPERIMENT, WHICH WAS DEPLOYED 110 M WEST OF THE LM, CONSISTED OF TWO SEISMIC ASSEMBLIES -- A LONG PERIOD (LP) SEISMOMETER (TRIAxIAL, ORTHOGONAL) WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80-DB DYNAMIC RANGE) AND A SHORT PERIOD (SP) SEISMOMETER (UNIAXIAL, VERTICAL MOTION) WITH A SEISMIC FREQUENCY FROM 0.05 TO 20 HZ (80-DB DYNAMIC RANGE). THE MINIMUM DETECTABLE SIGNAL OF THE PSE SEISMOMETERS WAS 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE SEISMOMETERS WERE HOUSED IN A DRUM-SHAPED ENCLOSURE ROUNDED IN THE BOTTOM. THIS ENCLOSURE RESTED ON A SUPPORT STRUCTURE (STOOL) AND WAS COVERED BY A THERMAL SHROUD AFTER DEPLOYMENT OF THE EXPERIMENT. THE APOLLO 15 SEISMOMETER WAS PART OF A TRIANGULAR NETWORK OF SEISMOMETERS THAT INCLUDED THE APOLLO 12 AND 14 SEISMOMETERS. (THE APOLLO 11 SEISMOMETER CEASED

FUNCTIONING ABOUT 2 MONTHS AFTER DEPLOYMENT ON JULY 20, 1969). FOUR MAJOR DISCOVERIES HAVE RESULTED FROM THE SEISMOMETER EXPERIMENTS -- (1) THE EXISTENCE OF A CRUST AND MANTLE, (2) DEPTH OF FOCUS OF CYCLIC MOON QUAKES AT 800 KM, (3) SWARMS OF NON-CYCLIC MOONQUAKES, AND (4) EFFICIENT SCATTERING OF ENERGY IN A NEAR-SOURCE REGION.

DATA SET NAME- SEISMIC EVENT TAPES

NSSDC ID 71-063C-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/02/71 TO 01/12/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 125 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MAGNETIC TAPES OF SEISMIC EVENTS DETECTED ON THE LONG-PERIOD COMPONENTS BY MANUAL SEARCH BY THE EXPERIMENTER OF THE COMPRESSED SCALE PLAYOUTS (DATA SET 71-063C-01D). COPIES WERE THEN MADE OF THE ORIGINAL PSE TAPES FOR THE TIME PERIODS WHEN SEISMIC EVENTS (GROUND MOVEMENTS) WERE OBSERVED. EACH EVENT TAPE CONTAINS DATA FROM ONE STATION ONLY, BUT DATA FROM THE SAME TIME PERIODS WERE COPIED IN CHRONOLOGICAL ORDER ONTO SEPARATE TAPES FOR EACH STATION. THUS, INTERVALS WHICH MAY CONTAIN NO DETECTABLE SIGNAL CAN BE ON THE EVENT TAPE BECAUSE AN EVENT WAS DETECTED AT ANOTHER STATION. THE TAPES WERE WRITTEN IN 7-TRACK, BINARY, AT 800 BPI AND ODD PARITY. SEVERAL COMPUTERS WERE USED IN PROCESSING THESE DATA.

DATA SET NAME- EXPANDED TIME SCALE PLAYOUTS OF LUNAR  
SEISMIC DATA ON 35-MM MICROFILM

NSSDC ID 71-063C-01C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/04/71 TO 09/08/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE EXPANDED TIME SCALE PLAYOUTS THAT ARE TAKEN DIRECTLY FROM THE PASSIVE SEISMIC EXPERIMENT EVENT TAPES (DATA SET 71-063C-01B) AND ARE NOT PROCESSED IN ANY WAY (E.G., NO FILTERING, SMOOTHING, SIGNAL AVERAGING, ETC.). THE PLAYOUTS (USUALLY 10 MIN IN LENGTH) WERE GENERATED FOR MOST LONG PERIOD (15 SEC RESONANCE) SEISMIC EVENTS, OBSERVED AT TWO OR THREE STATIONS BEGINNING FEBRUARY 5, 1971, WITH PEAK-TO-PEAK SIGNAL AMPLITUDES OF TWO OR MORE DIGITAL UNITS. DATA FROM THE ALSEP 15 BEGIN AUGUST 4, 1971. THE ANNOTATION FORMAT CONSISTS OF YEAR (IN WHICH THE PLAYOUT BEGINS), SKIP X MAG (C) (WHERE SKIP EQUALS THE TAPE IDENTIFICATION NUMBER, MAG EQUALS A MULTIPLICATIVE FACTOR WHICH ADJUSTS THE SIGNAL AMPLITUDE OF AN EVENT FOR PLOTTING, AND C EQUALS THE LONG-PERIOD (LP) COMPONENT WHERE X IS LPX, Y IS LPY, AND Z IS LPZ), THE DAY OF THE YEAR ON WHICH THE PLAYOUT BEGINS, AND HR, MIN, SEC, WHICH IS THE UNIVERSAL TIME AT WHICH THE PLAYOUT BEGINS. TIME TICKS ARE PLACED AT 1-MIN INTERVALS. THE TIME MARKS ARE NOT CORRECTED FOR POSSIBLE CLOCK ERRORS. NOTATIONS ON THE SEISMOGRAMS SUCH AS PHASE PICKS (E.G., P, S), EVENT CLASSIFICATION (E.G., A, B, C, M), ETC., ARE NOT PRIMARY DATA BUT INTERPRETATIONS AND SHOULD BE RECOGNIZED AND USED AS SUCH.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF LUNAR  
SEISMIC DATA ON 35-MM MICROFILM

NSSDC ID 71-063C-010

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 09/02/71 TO 05/16/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35-MM MICROFILM OF EXPERIMENTER-PRODUCED PLOTS CONTAINING LONG PERIOD X, Y, AND Z AND SHORT PERIOD Z SEISMIC VALUES. TO ENHANCE THE SIGNAL-TO-NOISE RATIO FOR HIGHER FREQUENCY EVENTS, A DIFFERENCE METHOD WAS EMPLOYED IN REDUCTION OF THE DATA. THE ABSOLUTE VALUE OF THE DIFFERENCE BETWEEN CONSECUTIVE DATA POINTS IS SUMMED OVER 40 POINTS FOR LONG PERIOD DATA (320 POINTS FOR SHORT PERIOD DATA) AND THIS VALUE IS PLOTTED YIELDING ONE VALUE FOR EACH SIX SECONDS OF DATA. CONSECUTIVE POINTS ARE PLOTTED WITH OPPOSITE POLARITY TO YIELD A LINE WITH THE APPEARANCE OF A SEISMOGRAM. COMPONENTS ARE ARRANGED LPX, LPY, LPZ, SPZ WITH LONG PERIOD X AT THE TOP AND SHORT PERIOD Z AT THE BOTTOM. TIME TICKS ARE DISPLAYED EVERY 10 MINUTES AND EACH HOUR (UT) IS LABELED. THE YEAR AND DAY ARE DISPLAYED EVERY 6 HR. THE PLOTS ALSO CONTAIN THE VALUES FOR THE APOLLO 12, 14, AND 16 STATIONS FOR THE TIMES THEY ARE IN OPERATION, SIMULTANEOUSLY DISPLAYED ON THE ANALOG CHART. THESE PLOTS ARE USED TO IDENTIFY SEISMIC EVENTS AND TO DETERMINE THEIR START AND STOP TIMES.

DATA SET NAME- ARTIFICIAL LUNAR IMPACT SEISMIC DATA ON  
MAGNETIC TAPE

NSSDC ID 71-063C-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/03/71 TO 12/16/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF RECORDED SEISMIC DATA OF IMPACTS ON THE MOON OF MAN-MADE ORIGIN, ON MAGNETIC TAPE. THE TAPES ARE IDENTICAL IN FORMAT TO THE SEISMIC EVENT TAPES (71-063C-01B). COMPRESSED SCALE PLAYOUTS OF THESE ARTIFICIAL IMPACT EVENTS ARE AVAILABLE IN DATA SET 71-063C-01D.

DATA SET NAME- SEISMIC EVENT LOG AS CARD IMAGES ON  
MAGNETIC TAPE

NSSDC ID 71-063C-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/02/71 TO 04/21/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG LISTING ALL SEISMIC EVENTS OBSERVED ON THE LONG PERIOD COMPONENTS OF THE LUNAR SEISMIC NETWORK. IT IS TAPE-GENERATED FROM IBM CARDS SUPPLIED BY THE EXPERIMENTER. EVENTS ARE PRESENTED IN CHRONOLOGICAL ORDER WITH THE FOLLOWING PARAMETERS LISTED -- YEAR, DAY OF THE YEAR, EVENT START AND STOP TIMES (UT), MAXIMUM SIGNAL

AMPLITUDES, PLAYOUT, QUALITY, AND TYPE OR CLASS. A STOP TIME OF '0000' IMPLIES THAT THE EVENT OVERLAPS THE NEXT EVENT. THE AMPLITUDES GIVEN ARE FOR THE VERTICAL AXIS. AMPLITUDES WERE PICKED FROM THE COMPRESSED SCALE PLAYOUTS (DATA SET 71-063C-01D). AMPLITUDES ARE IN MILLIMETERS PICKED ON RECORDS PLOTTED AT A SCALE OF 400 DIGITAL UNITS PER INCH. A '1' IN THE PLAYOUT COLUMN IMPLIES THAT AN EXPANDED SCALE PLAYOUT (DATA SET 71-063C-01C) IS AVAILABLE FOR THAT EVENT. A QUALITY FACTOR IS ASSIGNED WHENEVER THE RECORD FOR AN EVENT IS OTHER THAN NORMAL. PRIORITY IS GIVEN TO THE SMALLEST APPROPRIATE NUMBER -- (1) NO DATA AT THE TIME THE EVENT OCCURRED, (2) CLOCK RATE ERROR, (3) NOISY RECORD, AND (4) RECORD MASKED BY ANOTHER EVENT. THE EVENT TYPE IS AN INTERPRETATION OF THE POSSIBLE ORIGIN OF THE EVENT WHERE (A) IS A CLASSIFIED MOONQUAKE, (M) IS A SUSPECTED MOONQUAKE, (C) IS A SUSPECTED METEOROID IMPACT, (Z) IS MOSTLY SHORT PERIOD, (X) IS AN UNUSUAL EVENT, (L) IS A LM IMPACT, AND (S) IS AN S-IVB IMPACT. THE EVENT CLASS GIVES THE CLASSIFICATION NUMBER FOR TYPE A EVENTS. ALL EVENTS IN THE SAME CLASS HAVE MATCHING WAVEFORMS. THE DATA ARE WRITTEN AT 556 BPI, BCD, 7-TRACK, ON AN IBM 7094 COMPUTER.

\*\*\*\*\*APOLLO 15 LM/ALSEP, SWANN

EXPERIMENT NAME- LUNAR FIELD GEOLOGY

NSSDC ID 71-063C-10

ORIGINAL EXPERIMENT INSTITUTION- US GEOLOGICAL SURVEY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.	SWANN	US GEOLOGICAL SURVEY	FLAGSTAFF, AZ
OI - W.R.	MUEHLBERGER	U OF TEXAS	AUSTIN, TX

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/02/71

#### EXPERIMENT BRIEF DESCRIPTION

THE LUNAR FIELD GEOLOGY INVESTIGATION EXPERIMENT WAS DESIGNED TO PROVIDE DATA ON THE NATURE AND DEVELOPMENT OF THE APENNINE MOUNTAIN AREA AND OF THE PROCESSES THAT HAVE MODIFIED THE MARE AND HIGHLAND SURFACE THROUGH THE STUDY OF DOCUMENTED LUNAR GEOLOGICAL FEATURES AND THE ANALYSIS OF RETURNED LUNAR SAMPLES. THIS EXPERIMENT WAS CONDUCTED BY THE APOLLO LUNAR GEOLOGY EXPERIMENT TEAM, IN CONSULTATION WITH THE MANNED SPACECRAFT CENTER (MSC) SCIENCE WORKING PANEL (REPRESENTING THE PRINCIPAL INVESTIGATOR). THE EQUIPMENT USED FOR THIS EXPERIMENT WAS A HAMMER, TONGS, AN EXTENSION HANDLE, A SMALL SAMPLING SCOOP, A GNDOM/COLOR PATCH, A SPRING SCALE, SAMPLE COLLECTION BAGS, SPECIAL ENVIRONMENTAL SAMPLE CONTAINERS, AND SAMPLE RETURN CONTAINERS. GEOLOGY CORE SAMPLES WERE ALSO OBTAINED WITH THE APOLLO LUNAR SURFACE DRILL (ALSD) CORE STEMS, BITS, AND CAPS (SEE APOL15C-06). THE HAND TOOLS (HAMMER, TONGS, ETC.) USED FOR THIS EXPERIMENT WERE THE STANDARD APOLLO LUNAR HAND TOOLS AND WERE CARRIED ON THE APOLLO LUNAR HAND TOOL CARRIER ON THE AFT PALLET OF THE LUNAR ROVER VEHICLE (LRV). APPROXIMATELY 82 KG (180 LB) OF VOLCANIC ROCKS, IMPACT ROCK BRECCIAS, AND SOIL SAMPLES WERE RETURNED.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 71-063C-10F  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC



TIME PERIOD COVERED- 07/31/71 TO 08/02/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE OF ALL APOLLO MISSIONS, MAINTAINED BY THE CURATOR'S OFFICE AT NASA JOHNSON SPACE CENTER (JSC). THIS VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY, WITH AUTHOR INDEX, MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE TN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE ANALYZED PROPERTY, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC., (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER, THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY. THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION, WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER, THE ENTRIES ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON MICROFICHE

NSSDC ID 71-063C-10G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 07/31/71 TO 08/02/71 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 6 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS A CATALOG OF LUNAR SAMPLE INFORMATION CONCERNING LUNAR SAMPLES FROM THE APOLLO 15 MISSION ON MICROFILM. THE CATALOG CONTAINS A PHOTOGRAPHIC INDEX OF 4-10 MM FINES CROSS-REFERENCING SAMPLE NO. AND FRAME NO., A COMPLETE INVENTORY, BINOCULAR DESCRIPTIONS OF THE SAMPLES, AND PHOTOS OF MOST OF THE ROCKS. FOR REPRESENTATIVE ROCKS AND FINES SAMPLES, THIN SECTION DESCRIPTIONS AND CHEMICAL ANALYSES ARE INCLUDED. FURTHER INFORMATION SUCH AS FIELD RELATIONS, LUNAR SURFACE PHOTOGRAPHY, SUMMARIES AND INTERPRETATIONS ARE PROVIDED.

\*\*\*\*\*APOLLO 16 CSM

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SPACECRAFT COMMON NAME- APOLLO 16 CSM  
ALTERNATE NAMES- 06000

NSSDC ID 72-031A

LAUNCH DATE- 04/16/72 SPACECRAFT WEIGHT IN ORBIT- 48606. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 04/27/72

EPOCH DATE- 04/20/72 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 120. MIN  
APOAPSIS- 120. KM ALT PERIAPSIS- 94. KM ALT INCLINATION- 12. DEG

#### SPACECRAFT BRIEF DESCRIPTION

APOLLO 16 WAS THE FIFTH MISSION IN THE APOLLO SERIES IN WHICH MEN LANDED ON THE MOON. THE 11-DAY SCIENTIFIC MISSION BEGAN ON APRIL 16, 1972, AT 1754 UT. (THE LAUNCH WAS POSTPONED FROM THE ORIGINALLY SCHEDULED DATE, MARCH 17, DUE TO A DOCKING RING JETTISON MALFUNCTION.) NAVY CAPTAIN JOHN W. YOUNG AND AIR FORCE LIEUTENANT CHARLES W. DUKE LANDED ON THE LUNAR SURFACE IN THE LUNAR MODULE (LM) ON APRIL 21. NAVY LIEUTENANT THOMAS K. MATTHEW REMAINED IN THE COMMAND MODULE (CM) PERFORMING SCIENTIFIC EXPERIMENTS WHILE THE CM WAS IN AN EQUATORIAL ORBIT ABOUT THE MOON. THE LM LANDED IN THE DESCARTES REGION OF THE MOON AT APPROXIMATELY 16 DEG E, 9 DEG S. AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED ON THE SURFACE. TERRAIN SAMPLES WERE ACQUIRED, AND PHOTOGRAPHS WERE OBTAINED BY THE SURFACE ASTRONAUTS AND FROM THE CM USING 16-, 35-, AND 70-MM FILM, 5- BY 48-IN. PANORAMIC FILM, AND 5-BY 5-IN. MAPPING FILM. THE SURFACE ASTRONAUTS ALSO TESTED THE SECOND LUNAR ROVING VEHICLE TO BE TAKEN TO THE MOON BY EXPLORING REGIONS WITHIN 4 KM OF THE LM LANDING SITE. A SUBSATELLITE CARRYING AN EXPERIMENT PACKAGE WAS LAUNCHED INTO LUNAR ORBIT ON APRIL 24, 1972, AND IMPACTED WITH THE MOON AFTER 425 REVOLUTIONS ON MAY 29, 1972. THE CM AND LM REJOINED AND THE CM RETURNED TO EARTH, LANDING IN THE PACIFIC OCEAN ON APRIL 27, 1972.

#### \*\*\*\*\*APOLLO 16 CSM, DOYLE

EXPERIMENT NAME- HANDHELD PHOTOGRAPHY

NSSDC ID 72-031A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 04/27/72

#### EXPERIMENT BRIEF DESCRIPTION

THE HANDHELD PHOTOGRAPHY EXPERIMENT INCLUDED THREE CAMERAS EACH ON THE COMMAND MODULE AND ON THE LUNAR MODULE. ON THE CM THERE WAS A 70-MM HASSELBLAD ELECTRIC CAMERA (HEC), A 16-MM DATA ACQUISITION CAMERA (DAC), AND A 35-MM NIKON CAMERA. FOR THE LUNAR SURFACE, THERE WAS A 16-MM DATA ACQUISITION CAMERA (LDAC), AND TWO 70-MM HASSELBLAD ELECTRIC CAMERAS (HEC). ONE WITH A 500-MM TELEPHOTO LENS, AND THE OTHER WITH A 60-MM LENS. THE TYPES OF FILM USED IN THESE CAMERAS WERE II A-0 (SPECTROSCOPIC) FOR THE S-177 UV PHOTOGRAPHY EXPERIMENT, SO-368 AND SO-168 COLOR FILMS, AND 3414 (LBW), 2485 (VHBW), AND 3401 BLACK AND WHITE FILMS. PHOTOGRAPHIC TARGETS ON THE SURFACE OF THE MOON WERE CORE TUBE SAMPLES, IN SITU ROCK SAMPLES (SOME STEREOSCOPIC), PANORAMAS OF THE LANDING SITE AREA AND SURROUNDINGS, ALSEP INSTRUMENTS AFTER DEPLOYMENT, TRENCHES, INTERESTING CRATERS, OTHER SURFACE

FEATURES, AND FIELD RELATIONSHIPS. FROM ORBIT, THE PHOTOGRAPHIC TARGETS WERE THE EARTH AND MOON IN UV (EXPERIMENT S-177), THE LUNAR FAR SIDE AND EASTERN LIMB REGIONS, THE SOLAR CORONA AT SUNSET AND SUNRISE TIMES, THE EARTH'S LIMB DURING SOLAR ECLIPSE, A COMET IF AVAILABLE, THE LUNAR LIBRATION REGION, ZODIACAL LIGHT, THE NEAR TERMINATOR REGIONS OF THE LUNAR SURFACE, AND THE LUNAR SURFACE IN EARTHSHINE. THE VARIOUS CAMERAS HAD SEVERAL DIFFERENT LENSES WITH DIFFERENT FOCAL LENGTHS. THE HEC HAD LENSES WITH FOCAL LENGTHS OF 60, 80, 105, AND 250 MM. THE 35-MM CAMERA HAD A 55-MM FOCAL LENGTH, AND THE 16-MM DAC HAD LENSES OF 18- AND 10-MM FOCAL LENGTH. SEVENTY-FIVE PERCENT OF THE LOW-LIGHT-LEVEL TARGETS WERE PHOTOGRAPHED. THOUSANDS OF USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- NSSDC CATALOG OF HASSELBLAD PHOTOS ON NSSDC ID 72-031A-01I  
MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/16/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE COMPLETE SET OF 70-MM HASSELBLAD PHOTOGRAPHY FROM THE APOLLO 16 MISSION, ON 16-MM MICROFILM. THIS MICROFILM WAS GENERATED AT NSSDC FOR CATALOG PURPOSES, TAKING CARE THAT ALL FRAME NUMBERS WERE LEGIBLE. THE QUALITY IS SUFFICIENTLY GOOD FOR SOME SCIENTIFIC STUDIES.

DATA SET NAME- NSSDC HASSELBLAD PICTORIAL CATALOG ON NSSDC ID 72-031A-01J  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/16/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 60 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CONTAINING THE COMPLETE SET OF HASSELBLAD 70-MM PHOTOGRAPHY FROM THE APOLLO 16 MISSION AS PREPARED BY NSSDC FOR USE AS A CATALOG.

DATA SET NAME- INDEX TO 70-MM HASSELBLAD PHOTOGRAPHY ON NSSDC ID 72-031A-01K  
16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/16/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET, GENERATED AT NSSDC FROM HARDCOPY, CONSISTS OF 16-MM MICROFILM CONTAINING THE COMPLETE INDEX TO THE HASSELBLAD 70-MM PHOTOGRAPHY FROM THE APOLLO 16 MISSION. DATA SET 72-031A-01I IS ALSO CONTAINED ON THIS MICROFILM. IN ADDITION TO SUMMARY TABLES, THE PHOTOGRAPHY HAS BEEN INDEXED

IN TWO WAYS -- (1) IN NUMERICAL SEQUENCE BY FRAME NUMBER, AND (2) BY LONGITUDE IN 10-DEG INCREMENTS WITHIN WHICH THE PHOTOGRAPHS ARE LISTED CHRONOLOGICALLY. DATA INCLUDED IN THE CHRONOLOGICAL INDEX ARE FRAME NUMBER, PRINCIPAL POINT LATITUDE AND LONGITUDE (FOR ORBITAL PHOTOS, BUT BLANK FOR SURFACE PHOTOS), CAMERA TILT AND AZIMUTH IN DEGREES (FOR ORBITAL ONLY), ALTITUDES IN KM (FOR ORBITAL PHOTOS ONLY), FOCAL LENGTH OF LENS USED IN MM, SUN ELEVATION IN DEGREES, MISSION ACTIVITY (EVA NUMBER FOR SURFACE AND REVOLUTION NUMBER FOR ORBITAL PHOTOS), AND A DESCRIPTION OF PROMINENT FEATURES IN THE FIELD OF VIEW. DATA INCLUDED FOR THE LONGITUDE INCREMENT INDEX (FOR ORBITAL PHOTOS ONLY) ARE FRAME NUMBER, MAGAZINE IDENTITY, FILM TYPE, REVOLUTION NUMBER, ALTITUDE IN KM, SUN ELEVATION IN DEG, FOCAL LENGTH OF LENS IN MM, CAMERA TILT AND AZIMUTH IN DEG, PRINCIPAL POINT LATITUDE AND LONGITUDE IN DEGREES, AND A DESCRIPTION WHICH GIVES PROMINENT FEATURES IN THE FIELD OF VIEW.

DATA SET NAME- INDEX TO 16-MM MAURER PHOTOGRAPHY ON NSSDC ID 72-031A-01L  
16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/16/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE 16-MM MAURER PHOTOGRAPHY INDEX FROM THE APOLLO 16 MISSION, AS COPIED ONTO 16-MM MICROFILM BY NSSDC FROM JSC HARDCOPY. THE QUALITY IS GOOD. INFORMATION GIVEN IS -- MAGAZINE, FILM TYPE, LENS FOCAL LENGTH, AND DESCRIPTION OF AREAS PHOTOGRAPHED.

DATA SET NAME- INDEX OF HASSELBLAD PHOTOGRAPHY ON NSSDC ID 72-031A-01M  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/16/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 4 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE 70-MM HASSELBLAD PHOTOGRAPHY INDEX FROM THE APOLLO 16 MISSION COPIED BY NSSDC ONTO MICROFICHE FROM JSC HARDCOPY. THE QUALITY IS GOOD. INFORMATION GIVEN IS -- FRAME NUMBER, PRINCIPAL POINT LATITUDE AND LONGITUDE (FOR ORBITAL PHOTOS ONLY), CAMERA TILT AND AZIMUTH (FOR ORBITAL PHOTOS ONLY), LENS FOCAL LENGTH, SUN ELEVATION, MISSION ACTIVITY (FOR SURFACE), AND DESCRIPTION. THE INDEX IS ARRANGED IN TWO WAYS, (A) BY FRAME NUMBER, AND (B) BY LONGITUDE IN 10-DEG INCREMENTS.

\*\*\*\*\*APOLLO 16 CSM, DOYLE

EXPERIMENT NAME- PANORAMIC PHOTOGRAPHY

NSSDC ID 72-031A-02

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 04/26/72

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS A PHOTOGRAPHIC TASK ACCOMPLISHED ABOARD THE COMMAND SERVICE MODULE (CSM) IN THE SCIENTIFIC INSTRUMENT MODULE BAY (SIM BAY). THE ITEK PANORAMIC CAMERA HAD A 610-MM (24 IN.) FOCAL LENGTH LENS AND USED 127- BY 1219-MM (5- BY 48-IN.) B/W 3414 FILM. THE CAMERA WAS OPERATED AUTOMATICALLY AND PROVIDED STEREOSCOPIC COVERAGE BY TILTING FORWARD AND AFT ON A GIMBAL. THIS MOTION COMPENSATED THE FORWARD MOTION OF THE SPACECRAFT. THE PURPOSE OF THE EXPERIMENT WAS TO OBTAIN HIGH-RESOLUTION (1 TO 2 M) PANORAMIC PHOTOGRAPHS OF THE LUNAR SURFACE AT 100-KM ALTITUDE WITH STEREOSCOPIC AND MONOSCOPIC COVERAGE. THE EXPERIMENT WILL HELP THE PRINCIPAL INVESTIGATORS FOR THE OTHER SIM EXPERIMENTS TO CORRELATE THEIR EXPERIMENTAL DATA WITH LUNAR SURFACE TERRAIN FEATURES. TARGETS INCLUDED FAR SIDE FEATURES, EASTERN LIMB AREAS, NEARSIDE MARIA, THE LM LANDING SITE IN THE DESCARTES REGION, NEAR-TERMINATOR REGIONS (UNDER VERY LOW-ANGLE ILLUMINATION PROVIDING HIGH RELIEF OF THE TERRAIN), AND POSSIBLE APOLLO 17 LANDING AREAS. OVER 1400 USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- COMPLETE PANORAMIC CAMERA PHOTOGRAPHY NSSDC ID 72-031A-02D  
CATALOG ON 35-MM B/W MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/26/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, GENERATED AT NSSDC FROM DATA SET 72-031A-02A, CONSISTS OF THE COMPLETE PANORAMIC CAMERA PHOTOGRAPHY REDUCED ONTO 35-MM MICROFILM FOR CATALOG PURPOSES. THE QUALITY OF THE PHOTOGRAPHY IS SUFFICIENTLY GOOD TO PERMIT SOME SCIENTIFIC RESEARCH TO BE CONDUCTED FROM THEM.

DATA SET NAME- RECTIFIED PANORAMIC CAMERA PHOTOGRAPHY ON NSSDC ID 72-031A-02E  
9- BY 80-IN. B/W POSITIVE FILM

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/26/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1415 FRAMES

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE RECTIFIED PANORAMIC CAMERA PHOTOGRAPHY. THE CENTRAL 100-X 950-MM SECTION OF THE ORIGINAL 114-X 1219-MM (4.5-X 48-IN) FILM HAS BEEN RECTIFIED FOR MORE ACCURATE STEREOSCOPIC USE AND RECORDED ON 230-X 1827-MM (9-X 72-IN) FILM. THESE FRAMES MAY BE USED WITHOUT FURTHER AMPLIFICATION FOR USEFUL SCIENTIFIC RESEARCH. THE FRAME NUMBERS ARE THE SAME AS FOR THE ORIGINAL PANORAMIC CAMERA PHOTOGRAPHY, SO THAT THE INDEX FOR THAT PHOTOGRAPHY MAY BE CONSULTED.

DATA SET NAME- INDEX OF PANORAMIC CAMERA PHOTOGRAPHY ON NSSDC ID 72-031A-02F  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 5 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE PANORAMIC PHOTOGRAPHY INDEX FROM APOLLO 16 MISSION, COPIED ONTO MICROFICHE BY NSSDC. DATA GIVEN IN THE INDEX ARE FRAME NUMBER, CAMERA LOOK (FORWARD OR AFT), STEREO COMPANION FRAME NUMBER, PRINCIPAL POINT LATITUDE AND LONGITUDE, ALTITUDE REVOLUTION NUMBER, SUN ELEVATION, AND DESCRIPTION. IT IS ARRANGED IN TWO WAYS, (A) BY FRAME NUMBER, AND (B) BY LONGITUDE IN 10-DEG INCREMENTS.

\*\*\*\*\*APOLLO 16 CSM, DOYLE

EXPERIMENT NAME- METRIC PHOTOGRAPHY NSSDC ID 72-031A-03

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 04/26/72

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO OBTAIN HIGH-QUALITY METRIC PHOTOGRAPHS OF THE LUNAR SURFACE TAKEN SIMULTANEOUSLY WITH PHOTOGRAPHS FROM THE STELLAR CAMERA. A LASER ALTIMETER, WHICH WAS USED IN CONJUNCTION WITH THE MAPPING CAMERA, ACCURATELY MEASURED THE DISTANCE TO THE TERRAIN BEING PHOTOGRAPHED FOR SELENOGRAPHIC PURPOSES. THE STELLAR PHOTOGRAPHS PROVIDED ACCURATE SPACECRAFT ORIENTATION (ATTITUDE) DATA. THE METRIC CAMERA WAS CAPABLE OF 20-M RESOLUTION FROM AN ORBITAL ALTITUDE OF 100 KM. THE METRIC CAMERA HAD A 76-MM (3-IN) FOCAL LENGTH AND USED 3400 B/W FILM, AND THE F/2.8, 35-MM STELLAR CAMERA USED 3401 H/W FILM. THE CAMERA SYSTEM WAS MOUNTED IN THE SIM BAY OF THE CSM AND OPERATED AUTOMATICALLY. THE TARGETS WERE THE SAME AS THOSE FOR THE PANORAMIC CAMERA--FAR SIDE FEATURES, EASTERN LIMB AREAS, NEAR SIDE MARIA, THE LM LANDING SITE, NEAR-TERMINATOR REGIONS OF LOW-ANGLE ILLUMINATION, AND POSSIBLE APOLLO 17 LANDING AREAS. THE PHOTOGRAPHS HAD 78 PERCENT OVERLAP FOR EACH FRAME AND 55 PERCENT SIDE OVERLAP BETWEEN CONSECUTIVE REVOLUTIONS. OVER 2000 USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- NSSDC CATALOG OF METRIC PHOTOGRAPHY ON NSSDC ID 72-031A-03E  
MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/26/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE MAPPING (METRIC) CAMERA PHOTOGRAPHY REDUCED ONTO 16-MM MICROFILM PREPARED AT NSSDC FOR CATALOG PURPOSES.

DATA SET NAME- COMPLETE MAPPING CAMERA PHOTOGRAPHY  
CATALOG ON B/W POSITIVE MICROFICHE

NSSDC ID 72-031A-03F

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/26/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 57 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE MAPPING (METRIC) CAMERA PHOTOGRAPHY REDUCED ONTO MICROFICHE CARDS PREPARED AT NSSDC FOR CATALOG PURPOSES.

DATA SET NAME- INDEX OF MAPPING CAMERA PHOTOGRAPHY ON  
MICROFICHE

NSSDC ID 72-031A-03G

AVAILABILITY OF DATA SET- DATA AT NSSDC READY FOR DISTRIBUTION

TIME PERIOD COVERED- 04/21/72 TO 04/26/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 5 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE COMPLETE INDEX OF THE MAPPING (METRIC) CAMERA PHOTOGRAPHY, REPRODUCED ONTO MICROFICHE. FOR EACH PHOTO, THE INDEX CONTAINS FRAME NUMBER, REVOLUTION, ALTITUDE, PRINCIPAL POINT LATITUDE AND LONGITUDE, CAMERA TILT AND AZIMUTH, SUN ELEVATION, AND DESCRIPTION. IT IS ARRANGED IN TWO WAYS, (A) BY FRAME NUMBER, AND (B) BY LONGITUDE IN 10-DEG INCREMENTS.

\*\*\*\*\*APOLLO 16 CSM, HOWARD

EXPERIMENT NAME- BISTATIC RADAR

NSSDC ID 72-031A-12

ORIGINAL EXPERIMENT INSTITUTION- STANFORD U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - H.T.	HOWARD	STANFORD U	STANFORD, CA
OI - V.R.	ESHLEMAN	STANFORD U	STANFORD, CA
OI - A.M.	PETERSON	STANFORD U	STANFORD, CA
OI - G.L.	TAYLER	STANFORD U	STANFORD, CA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST EXPERIMENT DATA RECORDED- 04/23/72

### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, CARRIED ON THE APOLLO 16 MISSION, UTILIZED THE S-BAND (13-CM) AND VERY HIGH FREQUENCY (VHF OR 116-CM) TRANSMITTERS ON THE COMMAND AND SERVICE MODULE (CSM). THE CSM WAS ORIENTED TO DIRECT THE TRANSMISSIONS TO AN AREA ABOUT 10 KM IN DIAM ON THE LUNAR SURFACE. THE RADIO SIGNALS REFLECTED FROM THE LUNAR SURFACE WERE RECEIVED AT THE EARTH IN A MANNER THAT PRESERVED THE FREQUENCY, PHASE, POLARIZATION, AND AMPLITUDE INFORMATION. DIFFERENCES BETWEEN THE KNOWN CHARACTERISTICS OF THE TRANSMITTED SIGNALS AND THE CHARACTERISTICS OF THE ECHOES FROM THE LUNAR SURFACE WERE USED IN CONJUNCTION WITH SCATTERING THEORY TO DERIVE QUANTITATIVE INFERENCES ABOUT THE MOON. THE LUNAR PROPERTIES INFERRED WERE THE DIELECTRIC CONSTANT, THE AVERAGE SLOPE AND SLOPE PROBABILITY, DENSITY, SMALL-SCALE SURFACE ROUGHNESS, AND EMBEDDED ROCKS TO A DEPTH OF 20 M.

DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 13-CM BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE NSSDC ID 72-031A-12A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/23/72 TO 04/23/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MAGNETIC TAPE

## DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 13-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI BINARY MAGNETIC TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH, THE FIRST FIVE RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX, J. RECORD 1 CONTAINS  $J_{11}(K)$ , RECORD 2 CONTAINS  $J_{22}(K)$ , RECORD 3 CONTAINS THE REAL PART OF  $J_{12}(K)$ , RECORD 4 CONTAINS THE IMAGINARY PART OF  $J_{12}(K)$ , AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD 6 OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE, THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.



DATA SET NAME- REDUCED SHORT TIME AVERAGES OF 116-CM      NSSDC ID 72-031A-12B  
BISTATIC RADAR LUNAR OBSERVATIONS ON TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/23/72 TO 04/23/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET-      1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO BY THE EXPERIMENTER AS JM DOPTRACK TAPES, IS A COMPLETE SET OF REDUCED, SHORT-TIME AVERAGES OF THE ELECTROMAGNETIC WAVE SPECTRA FOR 116-CM BISTATIC RADAR OBSERVATIONS OF THE MOON. THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, 800 BPI BINARY MAGNETIC TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THESE DATA HAVE BEEN CORRECTED FOR INSTRUMENTAL EFFECTS, BUT ARE UNEDITED. THE DATA SET INCLUDES OBSERVATIONS MERGED WITH TRAJECTORY DATA AND CERTAIN ANCILLARY DATA COMPUTED FROM THE TRAJECTORY. EACH TAPE FILE CONTAINS A HEADER RECORD FOLLOWED BY MANY DATA RECORDS. THE HEADER RECORD INCLUDES A FILE IDENTIFIER, THE DATE THE DATA WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF RECORDS FOLLOWING THE HEADER RECORD. THE DATA RECORDS ARE GROUPED IN FRAMES OF SIX RECORDS EACH. THE FIRST FIVE RECORDS CONTAINING OBSERVATIONAL DATA WHILE THE SIXTH RECORD CONTAINS EPHEMERIS DATA. THE FIVE DATA RECORDS IN EACH FRAME CONTAIN ELEMENTS OF THE COHERENCY MATRIX. RECORD 1 CONTAINS  $J_{11}(K)$ , RECORD 2 CONTAINS  $J_{22}(K)$ , RECORD 3 CONTAINS THE REAL PART OF  $J_{12}(K)$ , RECORD 4 CONTAINS THE IMAGINARY PART OF  $J_{12}(K)$ , AND RECORD 5 CONTAINS THE FRACTIONAL POLARIZATION OF THE RECEIVED SIGNAL. RECORD 6 OF EACH DATA FRAME LISTS UT2 AT THE MIDPOINT OF THE FRAME, THE REFLECTED DOPPLER SHIFT MINUS THE DIRECT DOPPLER SHIFT, THE PREDICTED BANDWIDTH FOR A RMS SURFACE SLOPE OF 0.1, THE ANGLE OF INCIDENCE, THE SPACECRAFT ALTITUDE AND SPEED, THE RADAR CROSS-SECTION PREDICTED FOR A SMOOTH, CONDUCTING MOON, THE RADAR CROSS-SECTION DIVIDED BY THE RECEIVED POWER, AND THE COMPONENTS OF SELENOGRAPHIC UNIT POSITION VECTORS FOR THE POSITION AND VELOCITY OF THE SPACECRAFT, THE VECTOR FOR THE POSITION OF THE SPECULAR POINT, AND THE VECTOR FROM THE CENTER OF THE MOON TO THE CENTER OF THE EARTH. ALSO INCLUDED ARE THE SELENOGRAPHIC LATITUDE AND LONGITUDE FOR THE SPACECRAFT AND SPECULAR POINT POSITIONS, THE COMPONENT OF THE DOPPLER SHIFT DUE TO THE EARTH'S ROTATION, THE TOTAL DOPPLER SHIFT OF THE REFLECTED SIGNAL, THE SPEED OF THE SPECULAR POINT ON THE SURFACE OF THE MOON, VEHICLE LOOK ANGLE TO EARTH, AND EULER ANGLES OF LOCAL HORIZON COORDINATES.

DATA SET NAME- ANALYZED 13-CM AND 116-CM BISTATIC RADAR      NSSDC ID 72-031A-12C  
LUNAR OBSERVATIONS ON MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/23/72 TO 04/23/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET-      1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET, REFERRED TO AS THE INTEGRAL TAPES BY THE EXPERIMENTER, IS A COMPLETE SET OF ANALYZED DATA RECORDS DERIVED FROM THE REDUCED DATA RECORDS (OR JM DOPTRACK TAPES, DATA SETS 72-031A-12A AND 72-031A-12B). THIS DATA SET WAS RECEIVED FROM THE EXPERIMENTER AND IS ON 9-TRACK, BINARY TAPES WRITTEN IN XDS SIGMA 5 MACHINE IMAGES. THE DATA CONTAIN CERTAIN PROPERTIES OF THE REDUCED DATA AS WELL AS INFERRED PROPERTIES OF THE LUNAR SURFACE. EACH TAPE FILE IS COMPOSED OF ONE HEADER RECORD FOLLOWED BY MANY DATA RECORDS. EACH HEADER RECORD CONTAINS A FILE IDENTIFIER, THE DATE THE DATA

WERE TAKEN, THE TIME INCREMENT BETWEEN THE MIDPOINTS OF EACH DATA AVERAGING FRAME, AND THE NUMBER OF DATA RECORDS FOLLOWING THE HEADER RECORD. DATA RECORDS INCLUDE THE POLARIZED POWER, NORMALIZED POLARIZED POWER, UNPOLARIZED POWER, EQUIVALENT AREA BANDWIDTH, NORMALIZED ABSOLUTE MOMENT BANDWIDTH, NORMALIZED SECOND MOMENT BANDWIDTH, CENTROID OF THE ECHO SPECTRUM, RMS SLOPE INFERRED FROM EQUIVALENT AREA BANDWIDTH, HANDSCALED 1/2 POWER ECHO BANDWIDTH, A DATA VALIDITY FLAG, SPACECRAFT ANTENNA GAIN (OR ZERO), AND ALL THE EPHEMERIS AND ANCILLARY DATA CONTAINED ON DATA RECORD SIX IN EACH DATA FRAME OF THE REDUCED DATA TAPES (DATA SETS 72-031A-12A AND 72-031A-12B).

\*\*\*\*\*APOLLO 16 LM/ALSEP\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 16 LM/ALSEP NSSDC ID 72-031C  
ALTERNATE NAMES- ALSEP 16, LEM 16, ROVER 16, 06005, APOLLO 16C

LAUNCH DATE- 04/16/72 SPACECRAFT WEIGHT IN ORBIT- 5040. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

#### SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 16 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE DESCARTES HIGHLAND REGION JUST NORTH OF THE CRATER DOLLAND AT 8 DEG 59 MIN 55 SEC S LATITUDE, AND 15 DEG 31 MIN 12 SEC E LONGITUDE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP PACKAGE CONTAINED SEISMIC, MAGNETIC FIELD, AND HEAT FLOW EXPERIMENTS.

\*\*\*\*\*APOLLO 16 LM/ALSEP, KOVACH

EXPERIMENT NAME- ACTIVE SEISMIC NSSDC ID 72-031C-02

ORIGINAL EXPERIMENT INSTITUTION- STANFORD U

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - R.L. KOVACH STANFORD U STANFORD, CA  
OI - J.S. WATKINS U OF TEXAS, GALVESTON GALVESTON, TX

EXPERIMENT STATUS OF OPERATION- PARTIAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE ACTIVE SEISMIC EXPERIMENT (ASE) (S-033) WAS TO ACQUIRE DATA TO DETERMINE THE PHYSICAL PROPERTIES OF THE LUNAR SURFACE AND SUBSURFACE MATERIALS. BOTH NATURAL AND ARTIFICIALLY PRODUCED SEISMIC WAVES WERE MONITORED. THE ARTIFICIAL WAVES WERE PRODUCED BY SHOTGUN-LIKE CHARGES FIRED BY A 'THUMPER' DEVICE AND EXPLOSIVE GRENADE CHARGES FIRED FROM A MORTAR BOX ASSEMBLY BY AN ASTRONAUT. THE EQUIPMENT CONSISTED OF A THUMPER/GEOPHONE ASSEMBLY, A MORTAR PACKAGE ASSEMBLY, INTERCONNECTING CABLES, AND AN ELECTRONICS ASSEMBLY HOUSED IN THE CENTRAL STATION. THE ASE GENERATED AND MONITORED SEISMIC WAVES IN THE RANGE 3 TO 250 HZ WITH A FREQUENCY RESPONSE OF PLUS OR MINUS 3 DB IN THE FREQUENCY RANGE OF 3 TO 100 HZ. NATURAL SEISMIC WAVES WERE ALSO MONITORED WITHIN THIS RANGE WHILE THE

ALSEP STATION WAS OPERATING IN THE ASE MODE. THE DATA-GATHERING INTERVAL WAS SMALL BECAUSE THE CENTRAL STATION OPERATED IN THE ASE MODE ON THE AVERAGE OF ONLY 30 MIN/WEEK. THE THUMPER CONTAINED 21 STANDARD INITIATORS MOUNTED PERPENDICULAR TO ITS BASE PLATE, WHICH WAS SELECTED AND FIXED BY AN ASTRONAUT. THE THUMPER WAS CABLE-CONNECTED TO THE CENTRAL STATION AND WAS FIRED AT INTERVALS OF 5 M. THUMPER FIRINGS BEYOND APPROXIMATELY 40 M PRODUCED WEAK SIGNALS. ONE P-WAVE VELOCITY OF 114 M/SEC WAS MEASURED. THE GEOPHONES WERE ELECTROMAGNETIC LISTENING DEVICES THAT WERE CABLE-CONNECTED TO THE CENTRAL STATION, WHERE THEY WERE AMPLIFIED, DIGITIZED, AND TRANSMITTED TO EARTH. THEY WERE PLACED AT DISTANCES OF 3, 43, AND 93 M FROM THE CENTRAL STATION. THE MORTAR BOX GRENADES WERE ROCKET-LAUNCHED BY EARTH COMMAND. THEY IMPACTED AT RANGES OF APPROXIMATELY 150, 300, AND 900 M FROM THE DEPLOYED MORTAR BOX ASSEMBLY. THE DECISION NOT TO LAUNCH GRENADE NO. 1 (1500 M) WAS MADE BECAUSE THE LAUNCH ASSEMBLY PITCH-ANGLE SENSOR WENT OFF-SCALE HIGH, MAKING THE PITCH POSITION OF THE ASSEMBLY UNCERTAIN.

DATA SET NAME- ACTIVE SEISMIC EVENT DATA ON MAGNETIC TAPE NSSDC ID 72-031C-02A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 05/23/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 4 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MAGNETIC TAPES OF THE SEISMIC SIGNALS GENERATED BY THREE GRENADES FIRED FROM A MORTAR ACTIVATED BY A SIGNAL FROM EARTH, AND 19 SMALL EXPLOSIONS CREATED BY A THUMPER ACTIVATED BY THE ASTRONAUTS. THE SIGNALS WERE RECORDED BY GEOPHONES. THE DATA ARE ON REFORMATTED-LOG COMPRESSED TAPES AND WRITTEN AT 800 BPI IN BINARY 7-TRACK ON A UNIVAC 1108 COMPUTER. TEN SECONDS OF SEISMIC DATA ARE RECORDED FOR EACH THUMPER FIRING. THE THUMPER FIRINGS WITHIN 15 M OF A GEOPHONE HAVE IMPULSIVE BEGINNINGS AND THE SEISMIC SIGNALS HAVE MORE EMERGENT BEGINNINGS WITH INCREASING DISTANCE. THE PREDOMINANT FREQUENCY OF THE THUMPER IS 22 HZ. UP TO 41 M LITTLE DIFFICULTY EXISTS IN SELECTING THE ONSET OF THE SEISMIC SIGNALS. HOWEVER, AT GREATER DISTANCES, UNCERTAINTY ARISES IN DETERMINING THE BEGINNING OF THE SEISMIC WAVE ARRIVAL DUE TO THE MORE EMERGENT ONSET. THE GRENADE LAUNCHINGS PRODUCED A SEISMIC SIGNAL DETECTED BY THE ASE GEOPHONES. THE SEISMIC RECORDS ARE NOISY PRIOR TO THE ONSET OF THE IMPACT BECAUSE LAUNCHING SIGNALS DID NOT COMPLETELY DECAY TO PREFIRING CONDITIONS. THE DESIRED SIGNAL CAN BE RECOGNIZED BY A CHANGE IN FREQUENCY AS THE POWER SPECTRA FOR THE IMPACT SIGNALS HAVE A PREDOMINANT SIGNAL FREQUENCY OF 10 HZ COMPARED TO 15 TO 20 HZ FOR THE GRENADE LAUNCH SIGNAL. AS THE LAUNCH SIGNALS ARE CLOSELY REPRODUCIBLE FROM LAUNCH TO LAUNCH, A SIMPLE NOISE SUBTRACTION PROCESS CAN ALSO BE USED. A SIGNAL CAUSED BY THE THRUST OF THE LM ASCENT ENGINE WAS ALSO RECORDED. MOST OF THIS SIGNAL IS CONCENTRATED IN THE FREQUENCY BAND FROM 5 TO 8 HZ.

\*\*\*\*\*APOLLO 16 LM/ALSEP, LATHAM

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID 72-031C-01

ORIGINAL EXPERIMENT INSTITUTION- LAMONT-DOHERTY GEO OBS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,

TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G.V.	LATHAM	U OF TEXAS, GALVESTON	GALVESTON, TX
OI - R.F.	PRESS	MIT	CAMBRIDGE, MA
OI - G.H.	SUTTON	U OF HAWAII	HONOLULU, HI

EXPERIMENT STATUS OF OPERATION- NORMAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PASSIVE SEISMIC EXPERIMENT (PSE) (S-031), WHICH WAS PART OF THE ALSEP, WAS TO MEASURE SEISMIC SIGNALS FROM ALL EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE DATA FROM THIS EXPERIMENT WILL BE USED TO DETERMINE THE INTERNAL LUNAR STRUCTURE, RATE OF ENERGY RELEASE, AND NUMBERS AND MASSES OF IMPACTING METEORS. THIS EXPERIMENT USED THE DATA FROM EXPERIMENTS ON THE IMPACTS OF THE S-IV B AND LM ASCENT STAGES AS EXTERNAL CALIBRATION SOURCES. THE INSTRUMENT PACKAGE REPRESENTED THE FOURTH ACTIVE INSTRUMENT AVAILABLE IN THE LUNAR SEISMIC NETWORK AND WILL ENABLE SCIENTISTS TO LOCATE REGIONS OF SEISMIC ACTIVITY MORE PRECISELY. THE INSTRUMENT PACKAGE WAS COMPOSED OF TWO ASSEMBLIES -- (1) A LONG-PERIOD, TRIAXIAL, ORTHOGONAL SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80 DB) DYNAMICAL RANGE AND (2) A SHORT-PERIOD, UNIAXIAL, VERTICAL MOTION SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.05 TO 20 HZ (80-DB) DYNAMICAL RANGE AND THE MINIMUM DETECTABLE SIGNALS OF 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE INSTRUMENT PACKAGE WAS CABLE-CONNECTED TO THE CENTRAL ALSEP POWER STATION WHICH WAS DEPLOYED BY THE ASTRONAUTS.

DATA SET NAME- SEISMIC EVENT TAPES NSSDC ID 72-031C-01B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 01/12/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 88 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MAGNETIC TAPES OF SEISMIC EVENTS DETECTED ON THE LONG-PERIOD COMPONENTS BY MANUAL SEARCH BY THE EXPERIMENTER OF THE COMPRESSED SCALE PLAYOUTS (DATA SET 72-031C-01D). COPIES WERE THEN MADE OF THE ORIGINAL PSE TAPES FOR THE TIME PERIODS WHEN SEISMIC EVENTS WERE OBSERVED. EACH EVENT TAPE CONTAINS DATA FROM ONE STATION ONLY, BUT DATA FROM THE SAME TIME PERIODS WERE COPIED IN CHRONOLOGICAL ORDER ONTO SEPARATE TAPES FOR EACH STATION. THUS, INTERVALS WHICH MAY CONTAIN NO DETECTABLE SIGNAL CAN BE ON THE EVENT TAPE BECAUSE AN EVENT WAS DETECTED AT ANOTHER STATION. THE TAPES WERE WRITTEN IN 7-TRACK BINARY, AT 800 BPI AND ODD PARITY. SEVERAL COMPUTERS WERE USED FOR THESE DATA. SEE 71-063C-01B FOR FORMAT.

DATA SET NAME- EXPANDED TIME SCALE PLAYOUTS OF LUNAR NSSDC ID 72-031C-01C  
SEISMIC DATA ON 35-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 08/08/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE EXPANDED TIME SCALE PLAYOUTS THAT ARE TAKEN DIRECTLY FROM THE PASSIVE SEISMIC EXPERIMENT EVENT TAPES (DATA SET

71-063C-01B) AND ARE NOT PROCESSED IN ANY WAY (E.G., NO FILTERING, SMOOTHING, SIGNAL AVERAGING, ETC.). THE MULTI-STATION PLAYOUTS (USUALLY 10 IN LENGTH) WERE GENERATED FOR MOST LONG PERIOD 15-SEC RESONANCES SEISMIC EVENTS OBSERVED AT TWO OR THREE STATIONS, BEGINNING FEBRUARY 5, 1971, WITH PEAK-TO-PEAK SIGNAL AMPLITUDES OF TWO OR MORE DIGITAL UNITS. THE ANNOTATION FORMAT CONSISTS OF YEAR (IN WHICH THE PLAYOUT BEGINS), SKIP X MAG (C) (WHERE SKIP EQUALS THE TAPE IDENTIFICATION NUMBER, MAG EQUALS A MULTIPLICATIVE FACTOR WHICH ADJUSTS THE SIGNAL AMPLITUDE OF AN EVENT FOR PLOTTING, AND C EQUALS THE LONG-PERIOD COMPONENT WHERE X IS LPX, Y IS LPY, AND Z IS LPZ), THE DAY OF THE YEAR ON WHICH THE PLAYOUT BEGINS, AND HR, MIN, SEC, WHICH IS THE UNIVERSAL TIME AT WHICH THE PLAYOUT BEGINS. TIME TICKS ARE PLACED AT 1-MIN INTERVALS. THE TIME MARKS ARE NOT CORRECTED FOR POSSIBLE CLOCK ERRORS. NOTATIONS ON THE SEISMOGRAMS SUCH AS PHASE PICKS (E.G., P, S), EVENT CLASSIFICATION (E.G., A, B, C, M), ETC., ARE NOT PRIMARY DATA BUT INTERPRETATIONS AND SHOULD BE RECOGNIZED AND USED AS SUCH.

DATA SET NAME- COMPRESSED TIME SCALE PLOTS OF LUNAR SEISMIC DATA ON 35-MM MICROFILM NSSDC ID 72-031C-01D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 05/07/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 35-MM MICROFILM OF EXPERIMENTER PRODUCED PLOTS CONTAINING LONG PERIOD X, Y, AND Z AND SHORT PERIOD Z (GROUND MOVEMENT) SEISMIC VALUES. TO ENHANCE THE SIGNAL-TO-NOISE RATIO FOR HIGHER FREQUENCY EVENTS, A DIFFERENCE METHOD WAS EMPLOYED IN REDUCTION OF THE DATA. THE ABSOLUTE VALUE OF THE DIFFERENCE BETWEEN CONSECUTIVE DATA POINTS IS SUMMED OVER 40 POINTS FOR LONG PERIOD (15-SEC RESONANCE) DATA (320 POINTS FOR SHORT PERIOD (1-SEC RESONANCE) DATA) AND THIS VALUE IS PLOTTED YIELDING ONE VALUE FOR EACH 6 SEC OF DATA. CONSECUTIVE DIGITIZED POINTS ARE PLOTTED WITH OPPOSITE POLARITY TO YIELD A LINE WITH THE APPEARANCE OF A SEISMOGRAM. COMPONENTS ARE ARRANGED LPX, LPY, LPZ, SPZ WITH LONG PERIOD X AT THE TOP AND SHORT PERIOD Z AT THE BOTTOM. TIME TICKS ARE DISPLAYED EVERY 10 MINUTES AND EACH HOUR (UT) IS LABELED. THE YEAR AND DAY ARE DISPLAYED EVERY 6 HR. THE PLOTS ALSO CONTAIN THE VALUES FOR THE APOLLO 12, 14, AND 15 STATIONS SIMULTANEOUSLY DISPLAYED ON THE ANALOG CHART. THESE PLOTS ARE USED TO IDENTIFY SEISMIC EVENTS AND TO DETERMINE THEIR START AND STOP TIME.

DATA SET NAME- ARTIFICIAL LUNAR IMPACT SEISMIC DATA ON MAGNETIC TAPE NSSDC ID 72-031C-01E

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/15/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF RECORDED SEISMIC DATA OF IMPACTS ON THE MOON OF MAN-MADE ORIGIN, ON MAGNETIC TAPE. THE TAPES ARE SIMILAR IN FORMAT TO THE SEISMIC EVENT TAPES (DATA SET 71-063C-01B). COMPRESSED SCALE PLAYOUTS OF THE ARTIFICIAL IMPACT EVENTS ARE AVAILABLE IN DATA SET 72-031C-01D.

DATA SET NAME- SEISMIC EVENT LOG AS CARD IMAGES ON  
MAGNETIC TAPE

NSSDC ID 72-031C-01G

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 04/21/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG LISTING ALL SEISMIC EVENTS OBSERVED ON THE LONG PERIOD COMPONENTS OF THE LUNAR SEISMIC NETWORK. IT IS TAPE GENERATED FROM IBM CARDS SUPPLIED BY THE EXPERIMENTER. EVENTS ARE PRESENTED IN CHRONOLOGICAL ORDER WITH THE FOLLOWING PARAMETERS LISTED -- YEAR, DAY OF THE YEAR, EVENT START AND STOP TIMES (UT), MAXIMUM SIGNAL AMPLITUDES, PLAYOUT, QUALITY, AND TYPE CLASS. A STOP TIME OF '0000' IMPLIES THAT THE EVENT OVERLAPS THE NEXT EVENT. THE AMPLITUDES GIVEN ARE FOR THE VERTICAL AXIS. AMPLITUDES WERE PICKED FROM THE COMPRESSED SCALE PLAYOUTS (DATA SET 72-031C-01D). AMPLITUDES ARE IN MILLIMETERS PICKED ON RECORDS PLOTTED AT A SCALE OF 400 DIGITAL UNITS PER IN. A '1' IN THE PLAYOUT COLUMN IMPLIES THAT AN EXPANDED SCALE PLAYOUT (DATA SET 72-031C-01C) IS AVAILABLE FOR THAT EVENT. A QUALITY FACTOR IS ASSIGNED WHENEVER THE RECORD FOR AN EVENT IS OTHER THAN NORMAL. PRIORITY IS GIVEN TO THE SMALLEST APPROPRIATE NUMBER -- (1) NO DATA AT THE TIME THE EVENT OCCURRED, (2) CLOCK RATE ERROR, (3) NOISY RECORD, (4) RECORD MASKED BY ANOTHER EVENT. THE EVENT TYPE IS AN INTERPRETATION OF THE POSSIBLE ORIGIN OF THE EVENT WHERE (A) IS A CLASSIFIED MOONQUAKE, (M) IS A SUSPECTED MOONQUAKE, (C) IS A SUSPECTED METEOROID IMPACT, (Z) IS MOSTLY SHORT PERIOD, (X) IS AN UNUSUAL EVENT, (L) IS A LM IMPACT, (S) IS AN SIVB IMPACT. THE EVENT CLASS GIVES THE CLASSIFICATION NUMBER FOR TYPE A EVENTS. ALL EVENTS IN THE SAME CLASS HAVE MATCHING WAVEFORMS. THE DATA ARE WRITTEN AT 556 BPI IN BCD 7-TRACK ON AN IBM 7094 COMPUTER.

\*\*\*\*\*APOLLO 16 LM/ALSEP, MUEHLBERGER

EXPERIMENT NAME- LUNAR FIELD GEOLOGY

NSSDC ID 72-031C-05

ORIGINAL EXPERIMENT INSTITUTION- U OF TEXAS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - W.R. MUEHLBERGER U OF TEXAS AUSTIN, TX

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 04/24/72

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR FIELD GEOLOGY INVESTIGATION WAS TO OBTAIN DATA THAT WILL PROVIDE A BETTER UNDERSTANDING OF THE DESCARTES HIGHLANDS AREA AND THE PROCESSES WHICH HAVE FORMED AND MODIFIED THIS SURFACE THROUGH THE STUDY OF DOCUMENTED GEOLOGICAL FEATURES AND RETURNED LUNAR SAMPLES. THE MAJOR EQUIPMENT THAT WAS USED INCLUDED HAMMER, TONGS, EXTENSION HANDLE, ADJUSTABLE SAMPLING SCOOP, RAKE, GNDMON/COLOR PATCH, SPRING SCALE, CORE TUBES/CAPS, SAMPLE BAGS--BOTH DOCUMENTED AND GENERAL COLLECTION, SPECIAL ENVIRONMENTAL CONTAINERS, AND SAMPLE RETURN CONTAINERS. THE HAND TOOLS WERE LOCATED ON THE APOLLO LUNAR HAND TOOL CARRIER (ALHTC) ATTACHED TO THE LUNAR

ROVER'S AFT PALLET. ATTACHMENT OF TOOLS AND COLLECTION BAGS COULD BE MADE ON THE ASTRONAUTS' PORTABLE LIFE SUPPORT SYSTEMS (PLSS). PHOTOGRAPHY REQUIREMENTS FOR THIS EXPERIMENT WERE SATISFIED BY THE HASSELBLAD ELECTRIC DATA CAMERA WITH A 60-MM FOCAL LENGTH LENS AND BY REAL-TIME TV TRANSMISSIONS. SELECTION OF EXPERIMENT SITES WAS MADE BY THE ASTRONAUTS.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 72-031C-05B  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/21/72 TO 04/24/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE FOR ALL APOLLO MISSIONS. THE DATA BASE IS MAINTAINED BY THE CURATOR'S OFFICE AT NASA JOHNSON SPACE CENTER (JSC). THIS VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY, WITH AUTHOR INDEX, MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE IN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE PROPERTY ANALYZED, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC., (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER, THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY. THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION, WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER, EACH ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON NSSDC ID 72-031C-05C  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 04/20/72 TO 04/23/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 7 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS A CATALOG OF LUNAR SAMPLE INFORMATION FOR SAMPLES COLLECTED ON THE APOLLO 16 MISSION. INFORMATION CONTAINED IN THE CATALOG ARE THE FOLLOWING -- EXPLANATION OF THE NUMBERING SYSTEM FOR THE ROCKS, GRAIN SIZE ANALYSES, SAMPLE LOCATIONS, SAMPLE PROCESSING ENVIRONMENT, CHEMICAL ANALYSES, TOTAL CARBON ANALYSIS, AND SAMPLE DESCRIPTIONS. TABLES, INVENTORIES, PLOTS AND PHOTOGRAPHS OF SAMPLES ARE GIVEN.

\*\*\*\*\*APOLLO 17 CSM\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 17 CSM NSSDC ID 72-096A  
ALTERNATE NAMES- APOL17A, APOLLO 17A, 06300  
LAUNCH DATE- 12/07/72 SPACECRAFT WEIGHT IN ORBIT- 48606. KG  
SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 12/19/72  
EPOCH DATE- 12/12/72 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 118.8 MIN  
APOAPSIS- 130. KM ALT PERIAPSIS- 100. KM ALT INCLINATION- 23. DEG

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 17 MISSION WAS THE SIXTH AND LAST OF THE MANNED LUNAR LANDING MISSIONS IN THE APOLLO SERIES. THE CREWMEN WERE EUGENE A. CERNAN, COMMANDER, RONALD E. EVANS, COMMAND MODULE PILOT, AND HARRISON H. SCHMITT, LUNAR MODULE PILOT (THE FIRST SCIENTIST TO GO TO THE MOON). LAUNCH WAS AT 0033 EST (5.33 U.T., DECEMBER 7, 1972). THE FLIGHT LASTED 12 DAYS. THE LUNAR MODULE CARRYING ASTRONAUTS CERNAN AND SCHMITT LANDED ON THE MOON ON THE MORNING OF DECEMBER 11 IN THE TAURUS-LITTROW AREA AT 30 DEG 48 MIN E AND 20 DEG 10 MIN N. IN A VALLEY 11 KM WIDE BETWEEN MOUNTAINS 1500 M HIGH IN THE NORTH AND 2000 M HIGH IN THE SOUTHWEST. THIS LOCATION IS ON THE SE RIM OF MARE SERENITATIS. THE ASTRONAUTS REMAINED ON THE SURFACE FOR 73 HR. ASTRONAUT EVANS REMAINED IN THE COMMAND MODULE IN ORBIT AND CONDUCTED EXPERIMENTS WHILE THE OTHERS WERE ON THE SURFACE. ASTRONAUTS CERNAN AND SCHMITT HAD A LUNAR ROVING VEHICLE (LRV) AND RODE TO DISTANCES UP TO ABOUT 3 KM FROM THE LUNAR MODULE. THERE WERE THREE PERIODS OF EXTRAVEHICULAR ACTIVITY (EVA) ON THE SURFACE IN WHICH THE ASTRONAUTS DEPLOYED THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), AND CONDUCTED GEOLOGICAL STUDIES OF A VARIETY OF LUNAR FEATURES. ORANGE-COLORED MATERIAL WAS FOUND FOR THE FIRST TIME ON ANY OF THE APOLLO MISSIONS.

\*\*\*\*\*APOLLO 17 CSM, DOYLE

EXPERIMENT NAME- HANDHELD PHOTOGRAPHY NSSDC ID 72-096A-05  
ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC  
EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)  
PI - F.J. DOYLE US GEOLOGICAL SURVEY RESTON, VA  
EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 12/19/72

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE HANDHELD PHOTOGRAPHY EXPERIMENT WERE (1) TO OBTAIN PHOTOGRAPHS OF LUNAR SURFACE FEATURES OF SCIENTIFIC INTEREST FROM LUNAR



ORBIT AND DURING TRANSLUNAR COAST AND (2) TO OBTAIN LOW-BRIGHTNESS PHOTOGRAPHS OF ASTRONOMICAL AND TERRESTRIAL SOURCES. THE LUNAR SURFACE TARGET PHOTOGRAPHS INCLUDED SPECIFIC SEGMENTS TAKEN IN EARTHSHINE AND LOW LIGHT LEVELS NEAR THE TERMINATOR TO COMPLEMENT THE PHOTOGRAPHS OBTAINED BY THE PANORAMIC AND METRIC (MAPPING) CAMERAS. PHOTOGRAPHS OF DIMLIGHT PHENOMENA SUCH AS THE DIFFUSE GALACTIC LIGHT FROM SELECTED CELESTIAL SUBJECTS, THE SOLAR CORONA, AND THE ZODIACAL LIGHT WERE ACQUIRED FROM ORBIT. COMETS IN THE APPROPRIATE COMBINATION OF TRAJECTORY AND CELESTIAL CONDITIONS WERE ALSO PHOTOGRAPHED. THE EQUIPMENT USED INCLUDED A 16-MM DATA ACQUISITION CAMERA (DAC) WITH AN 18-MM FOCAL LENGTH LENS (A SEXTANT WAS USED WITH THIS CAMERA FOR COMET PHOTOGRAPHY), A 70-MM HASSELBLAD ELECTRIC CAMERA WITH 80-MM AND 25-MM FOCAL LENGTH LENSES, AND A 35-MM NIKON CAMERA WITH A 55-MM FOCAL LENGTH LENS.

DATA SET NAME- COMPLETE HASSELBLAD PHOTOGRAPHY ON B/W POSITIVE FILM NSSDC ID 72-096A-05B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/07/72 TO 12/19/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1193 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF B/W, 70-MM FILM CONTAINING THE COMPLETE B/W HASSELBLAD PHOTOGRAPHY TAKEN DURING THE APOLLO 17 MISSION. ONE MAGAZINE CONTAINS ORBITAL LUNAR SURFACE PHOTOS, WHILE THE REST WERE TAKEN FROM THE SURFACE DURING THE EVA'S. THE PHOTOGRAPHY IS GENERALLY VERY GOOD ALTHOUGH SOME FRAMES SUFFER FROM UNDEREXPOSURE, OTHERS FROM OVEREXPOSURE, AND SOME ARE LIGHT-STRUCK.

DATA SET NAME- COMPLETE COLOR HASSELBLAD PHOTOGRAPHY ON 70-MM FILM NSSDC ID 72-096A-05C

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/07/72 TO 12/19/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2040 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF COLOR POSITIVE 70-MM FILM FROM THE APOLLO 17 MISSION. THE PHOTOGRAPHY CONTAINS BOTH ORBITAL AND SURFACE FRAMES. ORBITAL FRAMES COVER NEARSIDE AND FAR SIDE FEATURES, MANY OF WHICH ARE OF PROBABLE VOLCANIC ORIGIN, AND FARVIEW PHOTOS OF THE MOON DURING TRANS-EARTH INSERTION. THE SURFACE PHOTOGRAPHY SHOWS THE VARIOUS ALSEP INSTRUMENTS AFTER DEPLOYMENT, SURFACE ROCKS OF ALL SIZES, FEATURES IN THE VICINITY OF EACH OF THE EVA STOPS, THE ORANGE SOIL AROUND SHORTY CRATER, AND THE ROVER AND LM VEHICLES. THE PHOTOGRAPHY IS GENERALLY VERY GOOD ALTHOUGH SOME FRAMES ARE OVEREXPOSED AND SOME FRAMES ARE LIGHT-STRUCK.

DATA SET NAME- NIKON PHOTOGRAPHY

NSSDC ID 72-096A-05D

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/07/72 TO 12/19/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 410 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF PHOTOGRAPHY FROM THE 35-MM NIKON CAMERA. THE PHOTOGRAPHY CONTAINS FRAMES OF CABIN PHOTOS SHOWING ONBOARD EXPERIMENTS BEING CONDUCTED BY THE ASTRONAUTS, LUNAR FEATURES FROM ORBIT IN EARTHSHINE (ASHEN LIGHT), LUNAR VOLCANIC FEATURES (SINUOUS RILLS, MARE RIDGES, ORANGE SOIL, VOLCANIC CONES IN SERENITATIS, TURTLEBACK CRATERS), REINER-GAMMA, A SOLAR CORONA-LIKE FEATURE, BEYOND TERMINATOR EXPOSURES, STAR TRAILS OR CONTAMINATION PARTICLES, TSIOLKOVSKY ON THE FAR SIDE, ZODIACAL LIGHT, AND CALIBRATION WEDGES. MANY FRAMES ARE VERY UNDEREXPOSED OR UNEXPOSED. THE LUNAR LIMB SHOTS ARE OVEREXPOSED. A FEW FRAMES ARE OUT OF FOCUS.

DATA SET NAME- CALTECH CATALOG OF HASSELBLAD PHOTOGRAPHY NSSDC ID 72-096A-05F  
(IN MICROFICHE)

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/07/72 TO 12/19/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 43 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE ENTIRE HASSELBLAD 70-MM CAMERA PHOTOGRAPHY PRODUCED ONTO NEGATIVE MICROFICHE BY CAL TECH FOR CATALOG PURPOSES. THE QUALITY OF REPRODUCTION IS SUFFICIENTLY GOOD TO PERMIT SOME SCIENTIFIC STUDIES TO BE MADE DIRECTLY FROM THEM.

DATA SET NAME- LUNAR SURFACE TV KINESCOPE PHOTOGRAPHY NSSDC ID 72-096A-05G  
ON 16-MM B/W POSITIVE FILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/12/72 TO 12/14/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 39095 FEET OF B/W MOVIE/KINESCOPE FILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE COMPLETE TELEVISION COVERAGE OF THE SURFACE ACTIVITY DURING THE APOLLO 17 MISSION, REPRODUCED ONTO 16MM FILM. IT CONSISTS OF 22 HRS OF RUNNING TIME. IT IS DIVIDED INTO 1000-FT REELS. THE REELS ARE IN CHRONOLOGICAL ORDER.

\*\*\*\*\*APOLLO 17 CSM, DOYLE

EXPERIMENT NAME- PANORAMIC PHOTOGRAPHY NSSDC ID 72-096A-06

ORIGINAL EXPERIMENT INSTITUTION- NASA-JSC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE

US GEOLOGICAL SURVEY RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 12/16/72

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PANORAMIC CAMERA PHOTOGRAPHY EXPERIMENT WAS TO OBTAIN HIGH-RESOLUTION PANORAMIC PHOTOS WITH STEREOSCOPIC AND MONOSCOPIC COVERAGE OF THE LUNAR SURFACE. THESE PHOTOGRAPHS WILL AID THE PRINCIPAL INVESTIGATORS OF OTHER SCIENTIFIC INSTRUMENT MODULE (SIM) EXPERIMENTS IN CORRELATING THEIR SENSOR DATA WITH DATA ON THE LUNAR SURFACE. THE CAMERA, WHICH HAS A 24-IN. (610-MM) FOCAL LENGTH, PROVIDED 1- TO 2-M RESOLUTION FROM AN ORBITAL ALTITUDE OF 110 KM. THE CAMERA HAD FOUR MAIN COMPONENTS -- (1) A ROLL FRAME ASSEMBLY THAT ROTATED CONTINUOUSLY IN THE CROSS-TRACK SCAN DIRECTION, (2) A GIMBAL ASSEMBLY THAT TILTED FORE AND AFT TO PROVIDE STEREO COVERAGE AND FORWARD MOTION COMPENSATION (FMC), (3) THE MAIN FRAME, AND (4) A GASEOUS NITROGEN (GN2) PRESSURE VESSEL ASSEMBLY. THE OPTICS SYSTEM, CAMERA/FILM DRIVE AND CONTROL SYSTEM, AND FILM CASSETTE COMPLETE THE CAMERA SYSTEM. THE CAMERA SYSTEM WAS MOUNTED IN THE CSM SIM BAY BETWEEN THE TWO SIM SHELVES. IT WAS STORED WITH THE LENS INWARD TO PROTECT IT FROM CONTAMINATION SOURCES. THE PHOTOGRAPHY WAS AUTOMATIC, BUT THE CREWMEN COULD ACTIVATE, DEACTIVATE, AND CONTROL THE CAMERA POWER AND OPERATIONAL MODES. A CREWMAN RETRIEVED THE CASSETTE WITH THE PAN CAMERA PHOTOGRAPHY FROM THE SIM BAY ON AN EVA DURING TRANSEARTH COAST. OVER 1500 USEFUL PHOTOGRAPHS WERE OBTAINED.

DATA SET NAME- 5-IN. BY 48-IN. B/W SECOND GENERATION MASTER POSITIVE PANORAMA PHOTOS NSSDC ID 72-096A-06A

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1574 FRAMES

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 5-IN. X 48-IN. FRAMES OF B/W FILM FROM THE PANORAMIC CAMERA ON THE APOLLO 17 MISSION. BECAUSE OF A MALFUNCTION, MUCH OF THE PHOTOGRAPHY IS OVEREXPOSED IN THE HIGHLIGHT AREAS, WHICH WAS PARTLY OVERCOME BY SPECIAL DEVELOPMENT PROCESSES. MOST OF THE DETAIL REMAINS. ADDITIONAL SPECIAL PROCESSING COULD SHOW THE DETAIL AND FURTHER REDUCE THE HIGHLIGHTS, THOUGH AT THE EXPENSE OF THE LOWLIGHT AREAS. THE REMAINDER OF THE PHOTOGRAPHY IS GENERALLY VERY GOOD. MANY FRAMES CONTAIN NOTHING. THESE ARE USUALLY BEYOND TERMINATOR FRAMES IN WHICH THE LIGHT LEVEL WAS BELOW THRESHOLD DETECTION.

DATA SET NAME- PANORAMIC CAMERA PHOTOGRAPHY SUPPORT DATA ON 16-MM MICROFILM NSSDC ID 72-096A-06B

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET OF SUPPORT DATA FOR THE PANORAMIC CAMERA PHOTOGRAPHY FROM THE APOLLO 17 MISSION IS CONTAINED ON 16-MM MICROFILM. THE PARAMETERS

COVERED FOR THE PHOTOGRAPHY (ONE PAGE OF DATA PER PHOTO) ARE -- ORBITAL VECTORS, LONGITUDE AND LATITUDE OF THE NADIR POINT, LONGITUDE AND LATITUDE OF THE CAMERA AXIS INTERSECT, SPACECRAFT RADIUS AND ALTITUDE, AZIMUTH VELOCITY VECTOR AND HORIZONTAL VELOCITY, SCALE FACTOR, MEAN ALTITUDE RATE, TILT ANGLE AND AZIMUTH, SUN ELEVATION, AZIMUTH OF PRINCIPAL POINT, LONGITUDE AND LATITUDE OF SUBSOLAR POINT, EMISSION AND PHASE ANGLES, SWING AND NORTH DEVIATION ANGLES, TILT, HEADING, AND LASER SLANT RANGE. SUMMARY TABLES AND AN EXPLANATION OF THE PARAMETERS ARE GIVEN AT THE BEGINNING OF THE ROLL.

DATA SET NAME- NSSDC CATALOG OF PANORAMIC CAMERA PHOTOS    NSSDC ID 72-096A-06D  
ON 35-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET-        1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE 35-MM MICROFILM CATALOG OF THE PANORAMIC CAMERA PHOTOGRAPHY, FILMED AT NSSDC. IT CONTAINS THE COMPLETE PHOTOGRAPHY. IS OF GOOD QUALITY, AND MAY BE USED FOR SOME SCIENTIFIC PURPOSES.

DATA SET NAME- PANORAMIC CAMERA RECTIFIED PHOTOGRAPHY ON    NSSDC ID 72-096A-06F  
229 X 1829 MM (9 X 72-IN) FILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/10/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1574 FRAMES

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE ENTIRE PANORAMIC CAMERA PHOTOGRAPHY FROM THE APOLLO 17 MISSION THAT HAS BEEN CORRECTED (FOR CAMERA DISTORTIONS AND SPACECRAFT MOTION) AND REPRODUCED ONTO 229-X 1829-MM (9 X 72 IN.) FILM. QUALITY IS VERY GOOD BUT IS SLIGHTLY DEGRADED COMPARED WITH THE ORIGINAL. SUPPORTING DATA ARE THE SAME AS THE ORIGINAL PANORAMIC CAMERA PHOTOGRAPHY (DATA SET 72-096A-06A).

\*\*\*\*\*APOLLO 17 CSM, DOYLE

EXPERIMENT NAME- METRIC PHOTOGRAPHY                                NSSDC ID 72-096A-07

ORIGINAL EXPERIMENT INSTITUTION- US GEOLOGICAL SURVEY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - F.J. DOYLE                                US GEOLOGICAL SURVEY    RESTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 12/16/72

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO OBTAIN HIGH-QUALITY METRIC PHOTOGRAPHS OF THE SURFACE FROM LUNAR ORBIT COMBINED WITH TIME-CORRELATED STELLAR PHOTOGRAPHY FOR SELENOGETIC/CARTOGRAPHIC CONTROL. A LASER ALTIMETER WAS OPERATED WITH IT. THE EQUIPMENT WAS COMPOSED OF A FAIRCHILD 76MM- (3-IN) FOCAL LENGTH LENS AND A 74- X 74- ARC-SEC FIELD OF VIEW CAMERA. THE CAMERA WAS ORIENTED SUCH THAT THE TERRAIN LENS WAS POINTED AT THE NADIR WHILE THE 35-MM STELLAR CAMERA LENS WAS POINTED AT THE STELLAR FIELD AT AN ANGLE OF 96 DEG FROM THE LOCAL VERTICAL AND 90 DEG FROM THE DIRECTION OF FLIGHT. PHOTOGRAPHS WERE TAKEN WITH 78 PERCENT OVERLAP TO PROVIDE STEREOSCOPIC IMAGERY. FIVE IN. 3400 B/W FILM WAS USED, STORED IN A CASSETTE THAT WAS RETRIEVED BY AN ASTRONAUT IN AN EVA. THE CAMERA SYSTEM, OPERATED AUTOMATICALLY, WAS HOUSED IN THE SIM BAY OF THE SERVICE MODULE. THE STELLAR PHOTOGRAPHY, USING 3401 B/W FILM PROVIDED ACCURATE SPACECRAFT ATTITUDE INFORMATION. THE MAPPING CAMERA PROVIDED 20-M RESOLUTION FROM ITS ORBITAL HEIGHT. THE TARGETS WERE THE SAME AS FOR THE ITEK PANORAMIC CAMERA.

DATA SET NAME- MAPPING CAMERA PHOTOGRAPHY SUPPORT DATA      NSSDC ID 72-096A-07C  
ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/11/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET OF SUPPORT DATA FOR THE MAPPING (METRIC) CAMERA PHOTOGRAPHY ON THE APOLLO 17 MISSION IS CONTAINED ON 16-MM MICROFILM. THE PARAMETERS COVERED IN THE DATA FOR THE PHOTOGRAPHY ARE -- ORBITAL VECTORS, LONGITUDE AND LATITUDE OF NADIR POINT, LONGITUDE AND LATITUDE OF CAMERA AXIS INTERSECT, SPACECRAFT RADIUS AND ALTITUDE, AZIMUTH VELOCITY VECTOR AND HORIZONTAL VELOCITY, SCALE FACTOR, MEAN ALTITUDE RATE, TILT ANGLE AND AZIMUTH, SUN ELEVATION, AZIMUTH OF PRINCIPAL POINT, LONGITUDE AND LATITUDE OF SUBSOLAR POINT, EMISSION AND PHASE ANGLE, SWING, NORTH DEVIATION ANGLES, TILT, HEADING AND LASER SLANT RANGE. THE BEGINNING OF THE ROLL CONTAINS SUMMARY TABLES AND EXPLANATORY INFORMATION ON THE PARAMETERS LISTED ABOVE. QUALITY OF REPRODUCTION IS GOOD.

DATA SET NAME- CAL TECH CATALOG OF METRIC PHOTOGRAPHY      NSSDC ID 72-096A-07D  
ON MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/11/72 TO 12/16/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 59 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE ENTIRE MAPPING (METRIC) CAMERA PHOTOGRAPHY ON MICROFICHE PRODUCED BY CAL TECH FOR CATALOG PURPOSES. THE REPRODUCTIONS ARE SUFFICIENTLY GOOD TO PERMIT SOME SCIENTIFIC STUDIES TO BE MADE DIRECTLY FROM THEM. THIS MICROFICHE CATALOG IS PARTICULARLY USEFUL IN CONJUNCTION WITH AUTOMATIC MICROFICHE RETRIEVAL SYSTEMS.

\*\*\*\*\*APOLLO 17 LM/ALSEP\*\*\*\*\*

SPACECRAFT COMMON NAME- APOLLO 17 LM/ALSEP NSSDC ID 72-096C  
ALTERNATE NAMES- APOLLO 17C, 06307, LEM 17, ROVER 17, ALSEP 17

LAUNCH DATE- 12/07/72 SPACECRAFT WEIGHT IN ORBIT- 5050. KG

SPACECRAFT STATUS OF OPERATION- PARTIAL

#### SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 17 LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED BY THE ASTRONAUTS IN THE NORTHEASTERN PORTION OF THE MOON (LATITUDE 20 DEG 10 MIN N, LONGITUDE 30 DEG 49 MIN E) ON THE SOUTHEASTERN RIM OF MARE SERENITATIS IN A DARK DEPOSIT BETWEEN MASSIVE UNITS OF THE SOUTHWESTERN TAURUS MOUNTAINS SOUTH OF LITROW CRATER. THE ALSEP EXPERIMENTS WERE POWERED BY A NUCLEAR POWER SOURCE AND INCLUDED STUDY OF THE ATMOSPHERIC AND IONIC ENVIRONMENT OF THE MOON, HEAT LOSS FROM THE LUNAR INTERIOR, LUNAR EJECTA AND METEORITES, LUNAR SEISMIC PROFILING, AND LUNAR SURFACE GRAVIMETER.

\*\*\*\*\*APOLLO 17 LM/ALSEP, LANGSETH

EXPERIMENT NAME- HEAT FLOW NSSDC ID 72-096C-01

ORIGINAL EXPERIMENT INSTITUTION- LAMONT-DOHERTY GEO OBS

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - M.G.	LANGSETH	LAMONT-DOHERTY GEO OBS	PALISADES, NY
OI - S.P.	CLARK, JR	YALE U	NEW HAVEN, CT
OI - J.L.	CHUTE, JR	LEHMAN COLLEGE	NEW YORK, NY

EXPERIMENT STATUS OF OPERATION- NORMAL

#### EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE HEAT FLOW EXPERIMENT (S-037) WAS TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. SPECIFIC OBJECTIVES WERE (1) MEASUREMENT OF THE SUBSURFACE VERTICAL TEMPERATURE GRADIENTS IN THE LUNAR SURFACE LAYER AS A FUNCTION OF TIME, (2) MEASUREMENT OF THE ABSOLUTE TEMPERATURE OF THE LUNAR SUBSURFACE AS A FUNCTION OF TIME, (3) DETERMINATION OF THE THERMAL CONDUCTIVITY OF THE LUNAR SUBSURFACE MATERIAL, AND (4) MEASUREMENT OF THE BRIGHTNESS TEMPERATURE OF THE LOCAL LUNAR SURFACE. MEASUREMENTS TAKEN OF THE HEAT FLUX THROUGH THE UPPER 2.4 M OF THE SURFACE PROVIDED DATA ON THE LUNAR SOIL THERMAL CONDUCTIVITY, CONTRIBUTED TO THE RESOLUTION OF ISSUES CONCERNING LUNAR INTERNAL HEATING PROCESSES, AND ESTABLISHED LIMITS OF CONSTRAINT ON THE INTERIOR TEMPERATURE AND COMPOSITION OF THE MOON. THE EXPERIMENT CONSISTED OF TWO PROBES, EACH ABOUT 1.2 M IN LENGTH, A SPECIAL TOOL FOR PROBE INSERTION, RADIATION SHIELDS FOR EACH PROBE, AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE ALSEP CONTROL STATION. TWO HOLES WERE DRILLED IN THE LUNAR SURFACE ABOUT 10 M APART. THE BORE SYSTEMS REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT WALL COLLAPSE. ONE PROBE WAS INSERTED INTO EACH HOLE, AND THE DEPTH OF THE PROBE WAS RECORDED.

DATA SET NAME- HEAT FLOW THERMAL CONDUCTIVITY DATA ON NSSDC ID 72-096C-01A  
MAGNETIC TAPE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/12/72 TO 12/13/73 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 600-FT REELS OF 7-TRACK, 800 BPI MAGNETIC TAPES IN BINARY CODE GENERATED ON AN IBM 1130, CONTAINING THE THERMAL CONDUCTIVITY MEASUREMENTS FROM THE HEAT-FLOW EXPERIMENT (S-037) AT THE TAURUS-LITTROW REGION OF THE MOON. THE DATA CONSIST OF A CHRONOLOGICAL SEQUENCE OF TIME POINTS, EACH ASSOCIATED WITH SEVERAL TEMPERATURES AND TEMPERATURE DIFFERENCES. THE TIME IS MEASURED IN MSEC SINCE THE BEGINNING OF THE EXPERIMENT AND THE TEMPERATURE DATA ARE IN DEG K. THE DATA HAVE BEEN ORGANIZED INTO FIVE GROUPS COMBINING FOUR PARAMETERS AS FOLLOWS -- (T) TEMPERATURE, (DT) TEMPERATURE DIFFERENCE, (G) GRADIENT BRIDGE, AND (R) RING BRIDGE. TWO NUMBERS ARE GIVEN -- THE FIRST REFERS TO THE PROBE (1 OR 2) AND THE SECOND DESIGNATES THE PROBE SECTION (UPPER -- 1, LOWER -- 2) OR THE THERMOCOUPLE NUMBER (1 OR 4). FOR EXAMPLE, DTG 11 REFERS TO A TEMPERATURE DIFFERENCE MEASUREMENT FROM THE GRADIENT BRIDGE IN THE UPPER SECTION OF PROBE 1. TREF REFERS TO THE TEMPERATURE OF THE THERMOCOUPLE REFERENCE BRIDGE, AND TC REFERS TO A THERMOCOUPLE TEMPERATURE.

\*\*\*\*\*APOLLO 17 LM/ALSEP, SWANN

EXPERIMENT NAME- LUNAR FIELD GEOLOGY

NSSDC ID 72-096C-02

ORIGINAL EXPERIMENT INSTITUTION- US GEOLOGICAL SURVEY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - G. SWANN US GEOLOGICAL SURVEY FLAGSTAFF, AZ

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 12/13/72

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR GEOLOGY INVESTIGATION EXPERIMENT (S-059) WAS TO OBTAIN A BETTER UNDERSTANDING OF THE TAURUS-LITTROW HIGHLANDS AND THE PROCESSES THAT HAVE MODIFIED THE HIGHLAND SURFACE THROUGH THE STUDY OF DOCUMENTED LUNAR GEOLOGICAL FEATURES AND RETURNED LUNAR SAMPLES. THE EQUIPMENT FOR THIS EXPERIMENT INCLUDED A HAMMER, TONGS, AN EXTENSION HANDLE, A LARGE SAMPLING SCOOP, A RAKE, A GNOMON/PHOTOMETRIC CHART, A SAMPLE SCALE (LOCATED IN THE LM ASCENT STAGE), CORE TUBES AND CAPS WITH A FOLLOWER TOOL, DOCUMENTED SAMPLE BAGS, AN LRV SAMPLER, SAMPLE COLLECTION BAGS, SPECIAL SAMPLE CONTAINERS, SAMPLE RETURN BAGS, AND SAMPLE RETURN CONTAINERS. THE USE OF A POWER HEAD AND SPINDLE, A CORE STEM ADAPTER, A TREADLE, A CORE STEM RACK, A CORE STEM EXTRACTOR, A CORE STEM DISPENSER, AN 0.82-M CORE STEM SECTIONS OPEN CORE BIT, A CORE STEM WRENCH, AND A CORE STEM VISE MOUNTED ON THE LRV AFT PALLET MADE IT POSSIBLE TO OBTAIN A DEEP CORE (3.3 M) SAMPLE. HASSELBLAD ELECTRIC CAMERAS (70 MM), WITH 60-MM FOCAL LENGTH LENSES, WERE USED FOR PHOTOGRAPHIC DOCUMENTATION OF THE EXPERIMENT. ABOUT 110 KG OF VOLCANIC ROCKS, IMPACT ROCK BRECCIAS, AND SOIL, INCLUDING THE ORANGE GLASSES, WERE RETURNED TO EARTH ON THIS MISSION.

DATA SET NAME- LUNAR SAMPLE DATA BASE LISTING SORTED BY NSSDC ID 72-096C-02R  
SAMPLE NUMBER ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/11/72 TO 12/13/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET IS THE CURRENT EDITION OF THE LUNAR SAMPLE DATA BASE FOR ALL APOLLO MISSIONS. THE DATA BASE IS MAINTAINED BY THE CURATOR'S OFFICE AT NASA JOHNSON SPACE CENTER (JSC). THE VERSION, CONTAINED ON 16-MM MICROFILM, INCLUDES (1) BIBLIOGRAPHY OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES, (2) THE ANALYSIS PRINTOUT OF THE LUNAR SAMPLE DATA BASE, AND (3) THE BOOK PRINTOUT OF THE LUNAR SAMPLE DATA BASE. THE BIBLIOGRAPHY IS A COLLECTION OF PUBLISHED PAPERS CONCERNING THE LUNAR SAMPLES AND OTHER RELATED TOPICS. A COPY OF THE BIBLIOGRAPHY, WITH AUTHOR INDEX, MAY BE OBTAINED FROM THE CURATOR'S OFFICE AT NASA-JSC OR AT NSSDC BY REQUESTING THE 'BIBLIOGRAPHY AND AUTHOR INDEX OF FORMALLY PUBLISHED PAPERS CONCERNING LUNAR SAMPLES.' EACH ENTRY HAS AN ACCESSION NUMBER, IN WHICH THE FIRST TWO NUMBERS ARE THE YEAR OF PUBLICATION, FOLLOWED BY SEQUENTIAL NUMBERS FOR EACH YEAR. THE REST OF THE NEW LUNAR SAMPLE DATA BASE IS A COLLECTION OF PUBLISHED CHEMICAL, ISOTOPIC, AGE, AND MODAL (MINERALOGIC) DATA CONCERNING THE SAMPLES. NOBLE GASES, LIGHT GASES, AND ORGANIC MOLECULES ARE NOT INCLUDED. THE DATA BASE SAMPLES COMPRISE OVER 30,000 ENTRIES ON THIS MICROFILM (OUT OF 100,000). THE REMAINING 70,000 ENTRIES ARE ANALYSES OF INDIVIDUAL MINERALS, GLASSES, AND LITHIC FRAGMENTS. THESE LATTER DATA MAY BE OBTAINED FROM DR. J. L. WARNER, CODE TN6, NASA-JSC, HOUSTON, TX 77058. INFORMATION CONTAINED IN ALL THE DATA ARE -- (A) SAMPLE NUMBER, (B) PHASE (PHYSICAL TYPE OF MATERIAL, E.G., CHIP, GLASS, WHOLE SAMPLE, ETC.), (C) ELEMENT, WHICH IS THE PROPERTY ANALYZED, E.G., AGE, ELEMENTS, OXIDES, MINERALS, ETC., (D) VALUE, WHICH IS THE MEASURED QUANTITY, (E) UNITS OF MEASUREMENT, (F) TAG, A NUMBER TO ELIMINATE REDUNDANCY IN REPLICATE ANALYSES, (G) METHOD OF ANALYSIS, E.G., ALPHA SPECTROSCOPY, COLORIMETRY, OR ATOMIC ABSORPTION, AND (H) ACCESSION NUMBER. THE ASSIGNED LOGGING NUMBER IN THE BIBLIOGRAPHY, THE BOOK PRINTOUT REPRESENTS ONE DETERMINATION, WHICH IS THE VALUE FOR ONE 'ELEMENT.' THE ENTRIES ARE LISTED BY SAMPLE NUMBER. WITHIN EACH SAMPLE NUMBER THE ENTRIES ARE LISTED BY ELEMENT, FIRST BY MODAL, THEN BY AGE AND CHEMICAL DATA. ALL ENTRIES ARE FOR TOTAL SAMPLES ONLY.

DATA SET NAME- CATALOG OF LUNAR SAMPLE STUDIES ON NSSDC ID 72-096C-02C  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 12/11/72 TO 12/13/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 8 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A CATALOG OF LUNAR SAMPLE INFORMATION. DATA CONTAINED IN THE CATALOG ARE -- (1) A COMPLETE INVENTORY, (2) BINOCULAR DESCRIPTIONS OF THE ROCKS, (3) PHOTOGRAPHS OF MOST OF THE ROCKS, AND (4) THIN SECTION DESCRIPTIONS AND CHEMICAL ANALYSES FOR REPRESENTATIVE ROCKS AND FINES SAMPLES. FURTHER INFORMATION SUCH AS FIELD RELATIONS LUNAR SURFACE PHOTOGRAPHY, SUMMARIES, AND INTERPRETATIONS IS PROVIDED. TABLES AND GRAPHS ARE INCLUDED. EXPLANATIONS OF THE SAMPLE NUMBERING SYSTEM AND SAMPLE PROCESSING ARE INCLUDED.



\*\*\*\*\*LUNAR ORBITER 1\*\*\*\*\*

SPACECRAFT COMMON NAME- LUNAR ORBITER 1 NSSDC ID 66-073A  
ALTERNATE NAMES- LUNAR ORBITER-A, ORBITER I, ORBITER-A, 02394

LAUNCH DATE- 09/10/66 SPACECRAFT WEIGHT IN ORBIT- 383. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 10/29/66

EPOCH DATE- 08/21/66 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 210. MIN  
APOAPSIS- 1850. KM ALT PERIAPSIS- 40. KM ALT INCLINATION- 12. DEG

#### SPACECRAFT BRIEF DESCRIPTION

THE LUNAR ORBITER 1 SPACECRAFT WAS DESIGNED PRIMARILY TO PHOTOGRAPH SMOOTH AREAS OF THE LUNAR SURFACE FOR SELECTION AND VERIFICATION OF SAFE LANDING SITES FOR SURVEYOR AND APOLLO MISSIONS. IT WAS ALSO EQUIPPED TO COLLECT SELENODETIC, RADIATION INTENSITY, AND MICROMETEOROID IMPACT DATA. THE SPACECRAFT WAS PLACED IN A CISELUNAR TRAJECTORY AND INJECTED INTO AN ELLIPTICAL LUNAR ORBIT FOR DATA ACQUISITION. IT WAS STABILIZED IN A THREE-AXIS ORIENTATION BY USING THE SUN AND THE STAR CANOPUS AS PRIMARY ANGULAR REFERENCES. A THREE-AXIS INERTIAL SYSTEM PROVIDED STABILIZATION DURING MANEUVERS AND WHEN THE SUN AND CANOPUS WERE OCCULTED BY THE MOON. COMMUNICATIONS WERE MAINTAINED BY AN S-BAND SYSTEM WHICH UTILIZED A DIRECTIONAL AND AN OMNIDIRECTIONAL ANTENNA. THE SPACECRAFT ACQUIRED PHOTOGRAPHIC DATA FROM AUGUST 18 TO 29, 1966, AND READOUT OCCURRED THROUGH SEPTEMBER 14, 1966. ACCURATE DATA WERE ACQUIRED FROM ALL OTHER EXPERIMENTS THROUGHOUT THE MISSION. THE SPACECRAFT WAS TRACKED UNTIL IT IMPACTED THE LUNAR SURFACE ON COMMAND AT 7 DEG N LATITUDE, 161 DEG E LONGITUDE (SELENOGRAPHIC COORDINATES) ON OCTOBER 29, 1966.

\*\*\*\*\*LUNAR ORBITER 1, KOSOFISKY

EXPERIMENT NAME- LUNAR PHOTOGRAPHIC STUDIES NSSDC ID 66-073A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-LARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - L.J. KOSOFISKY NASA HEADQUARTERS WASHINGTON, DC

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/29/66

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A DUAL-LENS CAMERA SYSTEM DESIGNED TO SATISFY THE PRIMARY MISSION OBJECTIVE OF PROVIDING PHOTOGRAPHIC INFORMATION FOR THE EVALUATION OF APOLLO AND SURVEYOR LANDING SITES. AN 80-MM LENS SYSTEM WAS USED TO OBTAIN MEDIUM-RESOLUTION (MR) PHOTOS, AND A 610-MM LENS SYSTEM WAS USED FOR HIGH-RESOLUTION (HR) PHOTOS. THE TWO SEPARATE LENS, SHUTTER, AND PLATEN SYSTEMS UTILIZED THE SAME FILM SUPPLY AND RECORDED IMAGERY SIMULTANEOUSLY IN ADJACENT AREAS ON 70-MM FILM. AUTOMATIC SEQUENCES OF 1, 4, 8, OR 16 PHOTOS WERE OBTAINED. AT AN ALTITUDE OF 46 KM, WHICH WAS APPROXIMATELY THE PERILUNE HEIGHT, THE HR SYSTEM PHOTOGRAPHED A 4.15- BY 16.6-KM AREA OF THE LUNAR SURFACE WHICH WAS CENTERED ON A 31.6- BY 37.4-KM AREA PHOTOGRAPHED BY THE MR SYSTEM. AT APOLUNE, WHICH OCCURRED ON THE

FAR SIDE AT ABOUT 1850-KM ALTITUDE, THE AREAS PHOTOGRAPHED WERE CORRESPONDINGLY LARGER. THE FILM WAS BIMATE PROCESSED ON BOARD AND OPTICALLY SCANNED, AND THE RESULTING VIDEO SIGNAL WAS TELEMETERED TO GROUND STATIONS. FILM DENSITY READOUT WAS ACCOMPLISHED BY A HIGH-INTENSITY LIGHT BEAM FOCUSED TO A 6.5-MICRON-DIAMETER SPOT ON THE SPACECRAFT FILM. THE SPOT SCANNER SWEEP 2.67 MM IN THE LONG DIMENSION OF THE SPACECRAFT FILM. THIS PROCESS WAS REPEATED 286 TIMES FOR EACH MILLIMETER OF FILM SCANNED. THE RASTER WAS COMPOSED OF 2.67- BY 65-MM SCAN LINES ALONG THE FILM. THE VIDEO SIGNAL RECEIVED AT THE GROUND STATION WAS RECORDED ON MAGNETIC TAPE AND ALSO FED TO GROUND RECONSTRUCTION EQUIPMENT (GRE), WHICH REPRODUCED THE PORTION OF THE IMAGE CONTAINED IN ONE RASTER ON A 35-MM FILM POSITIVE FRAMELET. OVER 26 FRAMELETS WERE REQUIRED FOR A COMPLETE MR PHOTOGRAPH AND 86 FOR A COMPLETE HR IMAGE. OF THE 211 SIMULTANEOUS EXPOSURES OBTAINED, 206 MR PHOTOS AND 13 HR PHOTOS WERE CONSIDERED USABLE. A SHUTTER MALFUNCTION PREVENTED NORMAL EXPOSURE OF MOST OF THE HR IMAGERY. EIGHT EACH OF THE USABLE MR AND HR PHOTOS ARE OF THE LUNAR FAR SIDE, AND TWO OF THESE INCLUDE THE EARTH'S IMAGE. EXCEPT FOR THE SHUTTER MALFUNCTION, EXPERIMENT PERFORMANCE WAS NOMINAL UNTIL THE FINAL READOUT ON SEPTEMBER 14, 1966. A DETAILED DESCRIPTION OF THE EXPERIMENT, A BIBLIOGRAPHY, AND INDEXES OF ALL THE AVAILABLE LUNAR ORBITER 1 THROUGH 5 PHOTOS ARE CONTAINED IN THE REPORT 'LUNAR ORBITER PHOTOGRAPHIC DATA,' NSSDC 69-05, JUNE 1969.

DATA SET NAME- LRC VERSION LOI PHOTOGRAPHY BY CALTECH ON NSSDC ID 66-073A-01L  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/18/66 TO 08/29/66 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 15 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS CONTAINING LUNAR ORBITER 1 PHOTOGRAPHY. THESE CARDS WERE REPRODUCED BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY FROM LANGLEY RESEARCH CENTER (LARC) POSITIVE FILM TRANSPARENCIES. EACH CARD CONTAINS UP TO 60 IMAGES. IN INSTANCES WHERE A FRAME IS NOT AVAILABLE, THE PLACE WHERE IT WOULD HAVE OCCURRED ON THE CARD IS LABELLED 'FRAME IS NOT AVAILABLE.' THE PRIMARY USE OF THIS DATA SET IS FOR CATALOG PURPOSES, BUT THE PHOTOGRAPHY IS GOOD ENOUGH FOR SOME SCIENTIFIC STUDIES TO BE MADE FROM IT.

\*\*\*\*\*LUNAR ORBITER 2\*\*\*\*\*

SPACECRAFT COMMON NAME- LUNAR ORBITER 2 NSSDC ID 66-100A  
ALTERNATE NAMES- ORBITER II, ORBITER-B, LUNAR ORBITER-B, 02534

LAUNCH DATE- 11/06/66 SPACECRAFT WEIGHT IN ORBIT- 387. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 10/11/67

EPOCH DATE- 11/19/66 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 210. MIN  
APOAPSIS- 1850. KM ALT PERIAPSIS- 40. KM ALT INCLINATION- 12. DEG

#### SPACECRAFT BRIEF DESCRIPTION

THE LUNAR ORBITER 2 SPACECRAFT WAS DESIGNED PRIMARILY TO PHOTOGRAPH SMOOTH AREAS OF THE LUNAR SURFACE FOR SELECTION AND VERIFICATION OF SAFE

LANDING SITES FOR SURVEYOR AND APOLLO MISSIONS. IT WAS ALSO EQUIPPED TO COLLECT SELENODETTIC, RADIATION INTENSITY, AND MICROMETEOROID IMPACT DATA. THE SPACECRAFT WAS PLACED IN A CISELUNAR TRAJECTORY AND INJECTED INTO AN ELLIPTICAL LUNAR ORBIT (APOLUNE 1850 KM, PERILUNE 40 KM) FOR DATA ACQUISITION. IT WAS STABILIZED IN A THREE-AXIS ORIENTATION BY USING THE SUN AND THE STAR CANOPUS AS PRIMARY ANGULAR REFERENCES. A THREE-AXIS INERTIAL SYSTEM PROVIDED STABILIZATION DURING MANEUVERS AND WHEN THE SUN AND CANOPUS WERE OCCULTED BY THE MOON. COMMUNICATIONS WERE MAINTAINED BY AN S-BAND SYSTEM WHICH UTILIZED A DIRECTIONAL AND AN OMNIDIRECTIONAL ANTENNA. THE SPACECRAFT ACQUIRED PHOTOGRAPHIC DATA FROM NOVEMBER 18 TO 25, 1966, AND READOUT OCCURRED THROUGH DECEMBER 7, 1966. ACCURATE DATA WERE ACQUIRED FROM ALL OTHER EXPERIMENTS THROUGHOUT THE MISSION. THE SPACECRAFT WAS USED FOR TRACKING PURPOSES UNTIL IT IMPACTED THE LUNAR SURFACE ON COMMAND AT 3.0 DEG N LATITUDE, 119.1 DEG E LONGITUDE (SELENOGRAPHIC COORDINATES) ON OCTOBER 11, 1967.

\*\*\*\*\*LUNAR ORBITER 2, KOSOFSKY

EXPERIMENT NAME- LUNAR PHOTOGRAPHIC STUDIES NSSDC ID 66-100A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-LARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - L.J. KOSOFSKY NASA HEADQUARTERS WASHINGTON, DC

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 11/25/66

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A DUAL-LENS CAMERA SYSTEM DESIGNED TO SATISFY THE PRIMARY MISSION OBJECTIVE OF PROVIDING PHOTOGRAPHIC INFORMATION FOR THE EVALUATION OF APOLLO AND SURVEYOR LANDING SITES. AN 80-MM LENS SYSTEM WAS USED TO OBTAIN MEDIUM-RESOLUTION (MR) PHOTOS, AND A 610-MM LENS SYSTEM WAS USED FOR HIGH-RESOLUTION (HR) PHOTOS. THE TWO SEPARATE LENS, SHUTTER, AND PLATEN SYSTEMS UTILIZED THE SAME FILM SUPPLY AND RECORDED IMAGERY SIMULTANEOUSLY IN ADJACENT AREAS ON 70-MM FILM. AUTOMATIC SEQUENCES OF 1, 4, 8, OR 16 PHOTOS COULD BE OBTAINED. AT AN ALTITUDE OF 46 KM, WHICH WAS APPROXIMATELY THE PERILUNE HEIGHT, THE HR SYSTEM PHOTOGRAPHED A 4.15- BY 16.6-KM AREA OF THE LUNAR SURFACE WHICH WAS CENTERED ON A 31.6- BY 37.4-KM AREA PHOTOGRAPHED BY THE MR SYSTEM. RESOLUTIONS WERE 1 AND 8 M, RESPECTIVELY. AT APOLUNE, ON THE MOON'S FAR SIDE AT ABOUT 1850-KM ALTITUDE, THE AREAS PHOTOGRAPHED WERE CORRESPONDINGLY LARGER. THE FILM WAS BIMAT PROCESSED ON BOARD AND OPTICALLY SCANNED, AND THE RESULTING VIDEO SIGNAL WAS TELEMETERED TO GROUND STATIONS. FILM DENSITY READOUT WAS ACCOMPLISHED BY A HIGH-INTENSITY LIGHT BEAM FOCUSED TO A 6.5-MICRON-DIAMETER SPOT ON THE SPACECRAFT FILM. THE SPOT SCANNER SWEEPED 2.67 MM IN THE LONG DIMENSION OF THE SPACECRAFT FILM. THIS PROCESS WAS REPEATED 286 TIMES FOR EACH MILLIMETER OF FILM SCANNED. THE RASTER WAS COMPOSED OF 2.67- BY 65-MM SCAN LINES ALONG THE FILM. THE VIDEO SIGNAL RECEIVED AT THE GROUND STATION WAS RECORDED ON MAGNETIC TAPE AND ALSO FED TO GROUND RECONSTRUCTION EQUIPMENT (GRE), WHICH REPRODUCED THE PORTION OF THE IMAGE CONTAINED IN ONE RASTER ON A 35-MM FILM POSITIVE FRAMELET. OVER 26 FRAMELETS WERE REQUIRED FOR A COMPLETE MR PHOTOGRAPH AND 86 FOR A COMPLETE HR IMAGE. OF THE 211 SIMULTANEOUS EXPOSURES, 209 MR AND 202 HR WERE COMPLETELY READ OUT. THE LOSS OF TWO FRAMES WAS DUE TO THE FAILURE OF THE TRAVELING-WAVE-TUBE AMPLIFIER DURING FINAL READOUT OPERATIONS. ALL RECOVERED PHOTOGRAPHY IS CONSIDERED USABLE. EXPERIMENT PERFORMANCE WAS NOMINAL UNTIL THE FINAL READOUT ON DECEMBER 7, 1966. A DETAILED DESCRIPTION OF THE EXPERIMENT, A BIBLIOGRAPHY, AND INDEXES

OF ALL THE AVAILABLE LUNAR ORBITER 1 THROUGH 5 PHOTOS ARE CONTAINED IN THE REPORT 'LUNAR ORBITER PHOTOGRAPHIC DATA,' NSSDC 69-05, JUNE 1969.

DATA SET NAME- LRC VERSION LD2 PHOTOGRAPHY BY CALTECH ON NSSDC ID 66-100A-01L  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/18/66 TO 11/25/66 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 15 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS CONTAINING LUNAR ORBITER 2 PHOTOGRAPHY. THESE CARDS WERE REPRODUCED BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY FROM LANGLEY RESEARCH CENTER (LARC) POSITIVE FILM TRANSPARENCIES. EACH CARD CONTAINS UP TO 60 IMAGES. IN INSTANCES WHERE A FRAME IS NOT AVAILABLE, THE PLACE WHERE IT WOULD HAVE OCCURRED ON THE CARD IS LABELLED 'FRAME IS NOT AVAILABLE.' THE PRIMARY USE OF THIS DATA SET IS FOR CATALOG PURPOSES, BUT THE PHOTOGRAPHY IS GOOD ENOUGH FOR SOME SCIENTIFIC STUDIES TO BE MADE FROM IT.

\*\*\*\*\*LUNAR ORBITER 3\*\*\*\*\*

SPACECRAFT COMMON NAME- LUNAR ORBITER 3 NSSDC ID 67-008A  
ALTERNATE NAMES- LUNAR ORBITER-C, ORBITER III, ORBITER-C, 02666

LAUNCH DATE- 02/05/67 SPACECRAFT WEIGHT IN ORBIT- 387. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 10/09/67

EPOCH DATE- 02/12/67 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 208. MIN  
APDAPSIS- 1850. KM ALT PERIAPSIS- 55. KM ALT INCLINATION- 20.9 DEG

SPACECRAFT BRIEF DESCRIPTION

THE LUNAR ORBITER 3 SPACECRAFT WAS DESIGNED PRIMARILY TO PHOTOGRAPH SMOOTH AREAS OF THE LUNAR SURFACE FOR SELECTION AND VERIFICATION OF SAFE LANDING SITES FOR SURVEYOR AND APOLLO MISSIONS. IT WAS ALSO EQUIPPED TO COLLECT SELENODETECT, RADIATION INTENSITY, AND MICROMETEOROID IMPACT DATA. THE SPACECRAFT WAS PLACED IN A CISELUNAR TRAJECTORY AND INJECTED INTO AN ELLIPTICAL LUNAR ORBIT FOR DATA ACQUISITION. IT WAS STABILIZED IN A THREE-AXIS ORIENTATION BY USING THE SUN AND THE STAR CANOPUS AS PRIMARY ANGULAR REFERENCES. A THREE-AXIS INERTIAL SYSTEM PROVIDED STABILIZATION DURING MANEUVERS AND WHEN THE SUN AND CANOPUS WERE OCCULTED BY THE MOON. COMMUNICATIONS WERE MAINTAINED BY AN S-BAND SYSTEM WHICH UTILIZED A DIRECTIONAL AND AN OMNIDIRECTIONAL ANTENNA. THE SPACECRAFT ACQUIRED PHOTOGRAPHIC DATA FROM FEBRUARY 15 TO 23, 1967, AND READOUT OCCURRED THROUGH MARCH 2, 1967. ACCURATE DATA WERE ACQUIRED FROM ALL OTHER EXPERIMENTS THROUGHOUT THE MISSION. THE SPACECRAFT WAS USED FOR TRACKING PURPOSES UNTIL IT IMPACTED THE LUNAR SURFACE ON COMMAND AT 14.3 DEG N LATITUDE, 97.7 DEG W LONGITUDE (SELENOGRAPHIC COORDINATES) ON OCTOBER 9, 1967.

\*\*\*\*\*LUNAR ORBITER 3, KOSOFKY

EXPERIMENT NAME- LUNAR PHOTOGRAPHIC STUDIES

NSSDC ID 67-008A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-LARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - L.J. KOSOFKY  
OI - I.G. RECENT

NASA HEADQUARTERS  
NASA-LARC

WASHINGTON, DC  
HAMPTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 02/23/67

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A DUAL-LENS CAMERA SYSTEM DESIGNED TO SATISFY THE PRIMARY MISSION OBJECTIVE OF PROVIDING PHOTOGRAPHIC INFORMATION FOR THE EVALUATION OF APOLLO AND SURVEYOR LANDING SITES. AN 80-MM LENS SYSTEM WAS USED TO OBTAIN MEDIUM-RESOLUTION (MR) PHOTOS, AND A 610-MM LENS SYSTEM WAS USED FOR HIGH-RESOLUTION (HR) PHOTOS. THE TWO SEPARATE LENS, SHUTTER, AND PLATEN SYSTEMS UTILIZED THE SAME FILM SUPPLY AND RECORDED IMAGERY SIMULTANEOUSLY IN ADJACENT AREAS ON THE SPACECRAFT'S 70-MM FILM. AUTOMATIC SEQUENCES OF 1, 4, 8, OR 16 PHOTOS COULD BE OBTAINED. AT AN ALTITUDE OF 55 KM, WHICH WAS APPROXIMATELY THE PERILUNE HEIGHT, THE HR SYSTEM PHOTOGRAPHED A 4.15- BY 16.6-KM AREA OF THE LUNAR SURFACE WHICH WAS CENTERED ON THE 31.6- BY 37.4-KM AREA PHOTOGRAPHED BY THE MR SYSTEM. RESOLUTIONS WERE 1 AND 8-M, RESPECTIVELY. AT APOLUNE, ON THE MOON'S FAR SIDE AT ABOUT 1850-KM ALTITUDE, THE AREAS PHOTOGRAPHED WERE CORRESPONDINGLY LARGER. THE FILM WAS BUILT PROCESSED ON BOARD, OPTICALLY SCANNED, AND THE RESULTING VIDEO SIGNAL TELEMETERED TO GROUND STATIONS. FILM DENSITY READOUT WAS ACCOMPLISHED BY A HIGH-INTENSITY LIGHT BEAM FOCUSED TO A 6.5-MICRON-DIAMETER SPOT ON THE SPACECRAFT FILM. THE FLYING SPOT SCANNER SWEEP 2.67 MM IN THE LONG DIMENSION OF THE SPACECRAFT FILM. THIS PROCESS WAS REPEATED 286 TIMES FOR EACH MILLIMETER OF FILM SCANNED. THE RASTER WAS COMPOSED OF 2.67- BY 65-MM SCAN LINES ALONG THE FILM. THE VIDEO SIGNAL RECEIVED AT THE GROUND STATION WAS RECORDED ON MAGNETIC TAPE AND ALSO FED TO GROUND RECONSTRUCTION EQUIPMENT (GRE), WHICH REPRODUCED THE PORTION OF THE IMAGE CONTAINED IN ONE RASTER ON A 35-MM FILM POSITIVE FRAMELET. OVER 26 FRAMELETS ARE REQUIRED FOR A COMPLETE MR PHOTOGRAPH AND 86 FOR A COMPLETE HR IMAGE. OF THE 211 SIMULTANEOUS EXPOSURES, THE PERFORMANCE WAS NOMINAL UNTIL THE FINAL READOUT ON MARCH 2, 1967. A DETAILED DESCRIPTION OF THE EXPERIMENT, A BIBLIOGRAPHY, AND INDEXES OF ALL THE AVAILABLE LUNAR ORBITER 1 THROUGH 5 PHOTOS ARE CONTAINED IN THE REPORT 'LUNAR ORBITER PHOTOGRAPHIC DATA,' NSSDC 69-05, JUNE 1969.

DATA SET NAME- LRC VERSION L03 PHOTOGRAPHY BY CALTECH ON NSSDC ID 67-008A-01L  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 02/15/67 TO 02/23/67 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 15 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS CONTAINING LUNAR ORBITER 3 PHOTOGRAPHY. THESE CARDS WERE REPRODUCED BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY FROM LANGLEY RESEARCH CENTER (LARC) POSITIVE FILM TRANSPARENCIES. EACH CARD CONTAINS UP TO 60 IMAGES. IN INSTANCES WHERE A FRAME IS NOT AVAILABLE, THE PLACE WHERE IT WOULD HAVE OCCURRED ON THE CARD IS LABELLED

'FRAME IS NOT AVAILABLE.' THE PRIMARY USE OF THIS DATA SET IS FOR CATALOG PURPOSES, BUT THE PHOTOGRAPHY IS GOOD ENOUGH FOR SOME SCIENTIFIC STUDIES TO BE MADE FROM IT.

\*\*\*\*\*LUNAR ORBITER 4

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SPACECRAFT COMMON NAME- LUNAR ORBITER 4 NSSDC ID 67-041A  
ALTERNATE NAMES- LUNAR ORBITER-D, ORBITER IV, ORBITER-D, 02772

LAUNCH DATE- 05/04/67 SPACECRAFT WEIGHT IN ORBIT- 387. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 10/31/67

EPOCH DATE- 05/11/67 ORBIT TYPE- SELENOCENTRIC ORBIT PERIOD- 720. MIN  
APOAPSIS- 6111. KM ALT PERIAPSIS- 2700. KM ALT INCLINATION- 85.5 DEG

#### SPACECRAFT BRIEF DESCRIPTION

LUNAR ORBITER 4 WAS DESIGNED PRIMARILY TO PHOTOGRAPH SMOOTH AREAS OF THE LUNAR SURFACE FOR SELECTION AND VERIFICATION OF SAFE LANDING SITES FOR THE SURVEYOR AND APOLLO MISSIONS. IT WAS ALSO EQUIPPED TO COLLECT SELENODETTIC, RADIATION INTENSITY, AND MICROMETEOROID IMPACT DATA. THE SPACECRAFT WAS PLACED IN A CISELUNAR TRAJECTORY AND INJECTED INTO AN ELLIPTICAL HIGHLY INCLINED LUNAR ORBIT FOR DATA ACQUISITION. IT WAS STABILIZED IN A THREE-AXIS ORIENTATION BY USING THE SUN AND THE STAR CANOPUS AS PRIMARY ANGULAR REFERENCES. A THREE-AXIS INERTIAL SYSTEM PROVIDED STABILIZATION DURING MANEUVERS AND WHEN THE SUN AND CANOPUS WERE OCCULTED BY THE MOON. COMMUNICATIONS WERE MAINTAINED BY AN S-BAND SYSTEM, WHICH UTILIZED A DIRECTIONAL AND AN OMNIDIRECTIONAL ANTENNA. THE SPACECRAFT ACQUIRED PHOTOGRAPHIC DATA FROM MAY 11 TO 26, 1967, AND READOUT OCCURRED THROUGH JUNE 1, 1967. ACCURATE DATA WERE ACQUIRED FROM ALL OTHER EXPERIMENTS THROUGHOUT THE MISSION. THE SPACECRAFT WAS USED FOR TRACKING PURPOSES UNTIL IT IMPACTED THE LUNAR SURFACE DUE TO NATURAL DECAY OF THE ORBIT NO LATER THAN OCTOBER 31, 1967, AT APPROXIMATELY 22 DEG TO 30 DEG W LONGITUDE.

#### \*\*\*\*\*LUNAR ORBITER 4, KOSOFSKY

EXPERIMENT NAME- LUNAR PHOTOGRAPHIC STUDIES NSSDC ID 67-041A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-LARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - L.J. KOSOFSKY NASA HEADQUARTERS WASHINGTON, DC  
OI - I.G. RECANI NASA-LARC HAMPTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 05/26/67

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A DUAL-LENS CAMERA SYSTEM DESIGNED TO SATISFY THE PRIMARY MISSION OBJECTIVE OF PROVIDING PHOTOGRAPHIC INFORMATION FOR MAPPING AND FOR THE EVALUATION OF APOLLO AND SURVEYOR LANDING SITES. AN 80-MM LENS SYSTEM WAS USED TO OBTAIN MEDIUM-RESOLUTION (MR) PHOTOS, AND A 610-MM LENS SYSTEM WAS USED FOR HIGH-RESOLUTION (HR) PHOTOS. THE TWO SEPARATE LENS, SHUTTER, AND PLATEN SYSTEMS UTILIZED THE SAME FILM SUPPLY AND RECORDED IMAGERY SIMULTANEOUSLY IN ADJACENT AREAS ON 70-MM FILM. CONTINUAL

AUTOMATIC SEQUENCES OF PHOTOS WERE OBTAINED. AT AN ALTITUDE OF 2700 KM, WHICH WAS APPROXIMATELY THE PERILUNE HEIGHT, THE SYSTEM PHOTOGRAPHED OVER 85 PERCENT OF THE LUNAR SURFACE. AT APOLUNE, ON THE MOON'S FAR SIDE AT ABOUT 6110-KM ALTITUDE, THE AREAS PHOTOGRAPHED WERE CORRESPONDINGLY LARGER. THE FILM WAS BIMATE PROCESSED ON BOARD AND OPTICALLY SCANNED, AND THE RESULTING VIDEO SIGNAL WAS TELEMETERED TO GROUND STATIONS. FILM DENSITY READOUT WAS ACCOMPLISHED BY A HIGH-INTENSITY LIGHT BEAM FOCUSED TO A 6.5-MICRON-DIAMETER SPOT ON THE SPACECRAFT FILM. THE SPOT SCANNER SWEEPED 2.67 MM IN THE LONG DIMENSION OF THE SPACECRAFT FILM. THIS PROCESS WAS REPEATED 286 TIMES FOR EACH MILLIMETER OF FILM SCANNED. THE RASTER WAS COMPOSED OF 2.67- BY 65-MM SCAN LINES ALONG THE FILM. THE VIDEO SIGNAL RECEIVED AT THE GROUND STATION WAS RECORDED ON MAGNETIC TAPE AND ALSO FED TO GROUND RECONSTRUCTION EQUIPMENT (GRE), WHICH REPRODUCED THE PORTION OF THE IMAGE CONTAINED IN ONE RASTER ON A 35-MM FILM POSITIVE FRAMELET. OVER 26 FRAMELETS WERE REQUIRED FOR A COMPLETE MR PHOTOGRAPH AND 86 FOR A COMPLETE HR IMAGE. FOGGING OF THE WINDOW RENDERED SOME PHOTOGRAPHS UNUSABLE. OTHERWISE, EXPERIMENT PERFORMANCE WAS NOMINAL UNTIL THE FINAL READOUT ON JUNE 1, 1967. A DETAILED DESCRIPTION OF THE EXPERIMENT, A BIBLIOGRAPHY, AND INDEXES OF ALL THE AVAILABLE LUNAR ORBITER 1 THROUGH 5 PHOTOS ARE CONTAINED IN THE REPORT, 'LUNAR ORBITER PHOTOGRAPHIC DATA,' NSSDC 69-05, JUNE 1969.

DATA SET NAME- LRC VERSION L04 PHOTOGRAPHY BY CALTECH ON NSSDC ID 67-041A-01K  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 05/11/67 TO 05/26/67 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 15 CARDS OF B/W MICROFICHE

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS CONTAINING LUNAR ORBITER 4 PHOTOGRAPHY. THESE CARDS WERE REPRODUCED BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY FROM LANGLEY RESEARCH CENTER (LARC) POSITIVE FILM TRANSPARENCIES. EACH CARD CONTAINS UP TO 60 IMAGES. IN INSTANCES WHERE A FRAME IS NOT AVAILABLE, THE PLACE WHERE IT WOULD HAVE OCCURRED ON THE CARD IS LABELLED 'FRAME IS NOT AVAILABLE.' THE PRIMARY USE OF THIS DATA SET IS FOR CATALOG PURPOSES, BUT THE PHOTOGRAPHY IS GOOD ENOUGH FOR SOME SCIENTIFIC STUDIES TO BE MADE FROM IT.

\*\*\*\*\*LUNAR ORBITER 5\*\*\*\*\*

SPACECRAFT COMMON NAME- LUNAR ORBITER 5 NSSDC ID 67-075A  
ALTERNATE NAMES- ORBITER V, ORBITER-E, LUNAR ORBITER-E, 02907

LAUNCH DATE- 08/01/67 SPACECRAFT WEIGHT IN ORBIT- 390. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 01/31/68

EPOCH DATE- 08/09/67 ORBIT TYPE- SELENCENTRIC ORBIT PERIOD- 510. MIN  
APOAPSIS- 6092. KM ALT PERIAPSIS- 97. KM ALT INCLINATION- 85. DEG

#### SPACECRAFT BRIEF DESCRIPTION

LUNAR ORBITER 5 WAS DESIGNED PRIMARILY TO PHOTOGRAPH SMOOTH AREAS OF THE LUNAR SURFACE FOR SELECTION AND VERIFICATION OF SAFE LANDING SITES FOR THE SURVEYOR AND APOLLO MISSIONS. IT WAS ALSO EQUIPPED TO COLLECT

SELENOGRAPHIC, RADIATION INTENSITY, AND MICROMETEOROID IMPACT DATA. THE SPACECRAFT WAS PLACED IN A CISELUNAR TRAJECTORY AND INJECTED INTO THREE ELLIPTICAL LUNAR ORBITS (APOLUNES 6092, 6092, AND 1500 KM, PERILUNES 200, 100, AND 97 KM) FOR DATA ACQUISITION. IT WAS STABILIZED IN A THREE-AXIS ORIENTATION BY USING THE SUN AND THE STAR CANOPUS AS PRIMARY ANGULAR REFERENCES. A THREE-AXIS INERTIAL SYSTEM PROVIDED STABILIZATION DURING MANEUVERS AND WHEN THE SUN AND CANOPUS WERE OCCULTED BY THE MOON. COMMUNICATIONS WERE MAINTAINED BY AN S-BAND SYSTEM, WHICH UTILIZED A DIRECTIONAL AND AN OMNIDIRECTIONAL ANTENNA. THE SPACECRAFT ACQUIRED PHOTOGRAPHIC DATA FROM AUGUST 6 TO 18, 1967, AND READOUT OCCURRED UNTIL AUGUST 27, 1967. ACCURATE DATA WERE ACQUIRED FROM ALL OTHER EXPERIMENTS THROUGHOUT THE MISSION. THE SPACECRAFT WAS TRACKED UNTIL IT IMPACTED THE LUNAR SURFACE ON COMMAND AT 2.79 DEG S LATITUDE, 83 DEG W LONGITUDE (SELENOGRAPHIC COORDINATES) ON JANUARY 31, 1968.

\*\*\*\*\*LUNAR ORBITER 5, KOSOFSKY

EXPERIMENT NAME- LUNAR PHOTOGRAPHIC STUDIES

NSSDC ID 67-075A-01

ORIGINAL EXPERIMENT INSTITUTION- NASA-LARC

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, OI=OTHER INVESTIGATOR, TL=TEAM LEADER, TM=TEAM MEMBER)

PI - L.J.	KOSOFSKY	NASA HEADQUARTERS	WASHINGTON, DC
OI - I.G.	RECENT	NASA-LARC	HAMPTON, VA

EXPERIMENT STATUS OF OPERATION- INOPERABLE

DATE LAST USABLE EXPERIMENT DATA RECORDED- 08/18/67

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A DUAL-LENS CAMERA SYSTEM DESIGNED TO SATISFY THE PRIMARY MISSION OBJECTIVE OF PROVIDING PHOTOGRAPHIC INFORMATION FOR THE EVALUATION OF APOLLO AND SURVEYOR LANDING SITES. AN 80-MM LENS SYSTEM WAS USED TO OBTAIN MEDIUM-RESOLUTION (MR) PHOTOS, AND A 610-MM LENS SYSTEM WAS USED FOR HIGH-RESOLUTION (HR) PHOTOS. THE TWO SEPARATE LENS, SHUTTER, AND PLATEN SYSTEMS UTILIZED THE SAME FILM SUPPLY AND RECORDED IMAGERY SIMULTANEOUSLY IN ADJACENT AREAS ON 70-MM FILM. AUTOMATIC SEQUENCES OF 1, 4, 8, OR 16 PHOTOS COULD BE OBTAINED. AT AN ALTITUDE OF 96 KM, WHICH WAS APPROXIMATELY THE PERILUNE HEIGHT, THE HR SYSTEM PHOTOGRAPHED A 10- BY 35-KM AREA OF THE LUNAR SURFACE WHICH WAS CENTERED ON A 70- BY 90-KM AREA PHOTOGRAPHED BY THE MR SYSTEM. RESOLUTIONS WERE 2 AND 20 M, RESPECTIVELY. AT APOLUNE, ON THE MOON'S FAR SIDE AT ABOUT 6000-KM ALTITUDE, THE AREAS PHOTOGRAPHED WERE CORRESPONDINGLY LARGER. THE FILM WAS BIMATEL PROCESSED ON BOARD AND OPTICALLY SCANNED, AND THE RESULTING VIDEO SIGNAL WAS TELEMETERED TO GROUND STATIONS. FILM DENSITY READOUT WAS ACCOMPLISHED BY A HIGH-INTENSITY LIGHT BEAM FOCUSED TO A 6.5-MICRON-DIAMETER SPOT ON THE SPACECRAFT FILM. THE SPOT SCANNER SWEEPED 2.67 MM IN THE LONG DIMENSION OF THE SPACECRAFT FILM. THIS PROCESS WAS REPEATED 286 TIMES FOR EACH MILLIMETER OF FILM SCANNED. THE RASTER WAS COMPOSED OF 2.67- BY 65-MM SCAN LINES ALONG THE FILM. THE VIDEO SIGNAL RECEIVED AT THE GROUND STATION WAS RECORDED ON MAGNETIC TAPE AND ALSO FED TO GROUND RECONSTRUCTION EQUIPMENT (GRE), WHICH REPRODUCED THE PORTION OF THE IMAGE CONTAINED IN ONE RASTER ON A 35-MM FILM POSITIVE FRAMELET. OVER 26 FRAMELETS WERE REQUIRED FOR A COMPLETE MR PHOTOGRAPH AND 86 FOR A COMPLETE HR IMAGE. OF THE 213 SIMULTANEOUS EXPOSURES OBTAINED, ALL WERE READ OUT SATISFACTORILY. EXPERIMENT PERFORMANCE WAS NOMINAL UNTIL THE FINAL READOUT ON AUGUST 27, 1967. A DETAILED DESCRIPTION OF THE EXPERIMENT, A BIBLIOGRAPHY, AND INDEXES OF ALL THE AVAILABLE LUNAR ORBITER 1 THROUGH 5 PHOTOS ARE CONTAINED IN THE REPORT, 'LUNAR ORBITER PHOTOGRAPHIC DATA,' NSSDC 69-05, JUNE 1969.



DATA SET NAME- LRC VERSION LOS PHOTOGRAPHY BY CALTECH ON NSSDC ID 67-075A-01K  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 08/06/67 TO 08/18/67 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 15 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF MICROFICHE CARDS CONTAINING LUNAR ORBITER 5 PHOTOGRAPHY. THESE CARDS WERE REPRODUCED BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY FROM LANGLEY RESEARCH CENTER (LARC) POSITIVE FILM TRANSPARENCIES. EACH CARD CONTAINS UP TO 60 IMAGES. IN INSTANCES WHERE A FRAME IS NOT AVAILABLE, THE PLACE WHERE IT WOULD HAVE OCCURRED ON THE CARD IS LABELLED \*FRAME IS NOT AVAILABLE.\* THE PRIMARY USE OF THIS DATA SET IS FOR CATALOG PURPOSES, BUT THE PHOTOGRAPHY IS GOOD ENOUGH FOR SOME SCIENTIFIC STUDIES TO BE MADE FROM IT.

\*\*\*\*\*MARINER 9

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SPACECRAFT COMMON NAME- MARINER 9 NSSDC ID 71-051A  
ALTERNATE NAMES- MARINER-I, MARINER MARS 71, MARIN-I, PL-712B, 05261

LAUNCH DATE- 05/30/71 SPACECRAFT WEIGHT IN ORBIT- 907. KG

SPACECRAFT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE SPACECRAFT DATA RECORDED- 10/27/72

EPOCH DATE- 11/16/71 ORBIT TYPE- MARSCENTRIC ORBIT PERIOD- 719. MIN  
APOAPSIS- 17168. KM ALT PERIAPSIS- 1250. KM ALT INCLINATION- 64.37 DEG

SPACECRAFT BRIEF DESCRIPTION

THE MARINER MARS 71 MISSION WAS PLANNED TO CONSIST OF TWO SPACECRAFT ON COMPLEMENTARY MISSIONS, BUT DUE TO THE FAILURE OF MARINER 8 TO LAUNCH PROPERLY, ONLY ONE SPACECRAFT WAS AVAILABLE. MARINER 9 COMBINED MISSION OBJECTIVES OF BOTH MARINER 8 (MAPPING 70 PERCENT OF THE MARTIAN SURFACE) AND MARINER 9 (A STUDY OF TEMPORAL CHANGES IN THE MARTIAN ATMOSPHERE AND ON THE MARTIAN SURFACE). FOR THE SURVEY PORTION OF THE MISSION, THE PLANETARY SURFACE WAS TO BE MAPPED WITH THE SAME RESOLUTION AS PLANNED FOR THE ORIGINAL MISSION, ALTHOUGH THE RESOLUTION OF PICTURES OF THE POLAR REGIONS WOULD BE DECREASED DUE TO THE INCREASED SLANT RANGE. THE VARIABLE FEATURES EXPERIMENTS WERE CHANGED FROM STUDIES OF SIX GIVEN AREAS EVERY 5 DAYS TO STUDIES OF SMALLER REGIONS EVERY 17 DAYS. MARINER 9 ARRIVED AT MARS ON NOVEMBER 14, 1971. THE SPACECRAFT GATHERED DATA ON THE ATMOSPHERIC COMPOSITION, DENSITY, PRESSURE, AND TEMPERATURE AND ON THE SURFACE COMPOSITION, TEMPERATURE, AND TOPOGRAPHY OF MARS. AFTER DEPLETING ITS SUPPLY OF ATTITUDE CONTROL GAS, THE SPACECRAFT WAS TURNED OFF OCTOBER 27, 1972.

\*\*\*\*\*MARINER 9, MASURSKY

EXPERIMENT NAME- TELEVISION PHOTOGRAPHY

NSSDC ID 71-051A-04

ORIGINAL EXPERIMENT INSTITUTION- NASA-JPL

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, DI=OTHER INVESTIGATOR,  
TL=TEAM LEADER, TM=TEAM MEMBER)

PI - H.	MASURSKY	US GEOLOGICAL SURVEY	FLAGSTAFF, AZ
OI - G.	DE VAULCOULEURS	U OF TEXAS	AUSTIN, TX
OI - J.	LEDERBERG	STANFORD U	STANFORD, CA
OI - W.	THOMPSON	BELLCOMM, INC	WASHINGTON, DC

EXPERIMENT STATUS OF OPERATION- INOPERABLE  
DATE LAST USABLE EXPERIMENT DATA RECORDED- 10/27/72

#### EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A 2-IN. VIDICON TELEVISION CAMERA WHICH TRANSMITTED PHOTOGRAPHY FROM MARS. IT WAS A PHOTOMETRICALLY CALIBRATED INSTRUMENT PROVIDING OVERLAPPING, SELECTIVELY FILTERED, LOW-RESOLUTION PICTURES AND BROADBAND (UNFILTERED) HIGH-RESOLUTION PICTURES, EACH NESTED IN A LOW-RESOLUTION OVERLAP. BOTH TYPES OF PICTURES HAD APPROXIMATELY A 700-BY 380-ELEMENT FORMAT, AND AN ORDER-OF-MAGNITUDE DIFFERENCE IN RESOLUTION BETWEEN THEM. RESOLUTION OF 500 M/TV LINE AND 50 M/TV LINE RESULTED FROM LOW (11 DEG BY 14 DEG) AND HIGH (1.1 DEG BY 1.4 DEG) RESOLUTION PICTURES TAKEN AT A PERIAPSIS ALTITUDE OF 2000 KM. THE OFFICIAL ORDERING SYSTEM OF IDENTIFICATION OF PICTURES WAS BY A 9-DIGIT NUMBER CALLED DATA AUTOMATION SET (DAS) WHICH IS CHRONOLOGICAL AND A KIND OF TIME. MORE THAN 7300 PICTURES OF THE MARTIAN SURFACE, THE MARTIAN SATELLITES, SATURN, AND STAP FIELDS WERE ACQUIRED DURING THE MISSION. A VARIETY OF PICTURE ENHANCEMENT TECHNIQUES HAVE BEEN APPLIED TO THE ORIGINAL DATA RESULTING IN MORE THAN 30,000 PHOTOGRAPHS BEING AVAILABLE THROUGH NSSDC. THESE DIFFERENT VERSIONS OF THE ORIGINAL IMAGERY WERE PROCESSED USING THE MISSION TEST VIDEO SYSTEM (MTVS) AND THE IMAGE PROCESSING LABORATORY AT JPL.

DATA SET NAME- PANORAMIC MOSAIC PHOTOGRAPHS ON 4- BY NSSDC ID 71-051A-04G  
5-IN. B/W FILM SHEETS

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 96 FRAMES

#### DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 4- X 5- IN. NEGATIVES CONTAINING THE MARINER 9 B CAMERA (NARROW-ANGLE, HIGH-RESOLUTION) PHOTOGRAPHY IN WHICH FRAMES IN A GIVEN QUADRANGLE OF THE MARTIAN SURFACE ARE SHOWN TOGETHER. THIS DATA SET WAS FILMED BY JPL FROM JPL-PREPARED MOSIAC BOARDS. FRAMES OF ADJACENT AREAS ARE ARRANGED TOGETHER, PRODUCING A KIND OF MOSIAC. THE LAST FOUR DIGITS OF THE DAS TIME ARE GIVEN BESIDE EACH FRAME, THE JPL-ASSIGNMENT BOARD NUMBER AT THE LOWER RIGHT CORNER, AND THE CAMERA AND TYPE OF PROCESSING (SHADING CORRECTED (SC) OR MAXIMUM DISCRIMINATION - EITHER VERTICALLY (VAGC) OR HORIZONTALLY (HAGC)) IN THE UPPER RIGHT CORNER. THE REVOLUTION NUMBER AND FULL DAS TIME ARE GIVEN IN EACH ROW. THE QUALITY IS EXCELLENT AND THESE PHOTOS CAN BE USED FOR SOME SCIENTIFIC PURPOSES, BUT THEIR MAIN PURPOSE IS FOR USE AS A CATALOG. AN INDEX, TOGETHER WITH REDUCED-SIZE COPY OF THE MOSAICS, IS AVAILABLE IN MICROFORM (SEE 71-051A-04N).

DATA SET NAME- TV PHOTOGRAPHIC SUPPORTING DATA ON 16-MM NSSDC ID 71-051A-04H

MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF 16-MM MICROFILM GENERATED AT NSSDC, AND CONTAINS THE SUPPORTING DATA FOR THE COMPLETE 70-MM PHOTOGRAPHY OF THE MARINER 9 MISSION. EXPLANATORY TABLES AND DIAGRAMS ARE AT THE BEGINNING OF THE ROLL AND PERTAIN TO THE FOLLOWING SUPPORTING DATA -- REVOLUTION NUMBER, DAS TIME, CAMERA, SHUTTER TIME IN GMT, DAY OF YEAR, FILTER AND EXPOSURE TIME, LOCAL TIME FROM TIME OF PERIAPSIS, DISTANCE FROM SPACECRAFT TO CENTER OF PLANET (RMAG), TRUE ANOMALY OF THE SPACECRAFT (SC/TA), SUN'S LATITUDE AND LONGITUDE, SPACECRAFT'S LATITUDES AND LONGITUDES, PRINCIPAL POINT'S LATITUDE AND LONGITUDE (Q LAT AND Q LONG), PICTURE HEIGHT AND WIDTH, NORTH DIRECTION ON THE PLANETARY SURFACE MEASURED IN THE IMAGE PLANE AND PIXEL SIZE, AND SUN ANGLE (WHICH IS THE SUN'S DIRECTION ON THE PLANET MEASURED IN THE IMAGE PLANE). THESE SUPPORT DATA ARE EARLY DATA THAT CONTAIN SOME ERRORS. THE SEDR SUPPORT DATA (DATA SET 71-051A-04K) ON MAGNETIC TAPE CONTAIN THE FINAL BEST DATA.

DATA SET NAME- TV PHOTOGRAPHY INDEX DATA ON 16-MM B/W NEGATIVE FILM NSSDC ID 71-051A-04I

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 2 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE INDEXES OF MTVS AND IPL VERSIONS OF THE MARINER 9 70-MM PHOTOGRAPHY, REPRODUCED AT NSSDC ON 16-MM MICROFILM FOR CATALOG PURPOSES. THE INDEXES ARE ARRANGED IN SIX DIFFERENT SORTS -- (1) PRINCIPAL POINT LATITUDE, (2) PRINCIPAL POINT LONGITUDE, (3) DAS TIME, (4) MTVS ROLL AND FILE NUMBER, (5) IPL ROLL AND PROCESS TIME, AND (6) COMMENTS. EACH SORT CONTAINS THE PARAMETERS LISTED ABOVE AND, IN ADDITION, GIVES THE REVOLUTION NUMBER.

DATA SET NAME- IPL MICROFICHE CATALOG OF SELECTED PHOTOGRAPHY NSSDC ID 71-051A-04J

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 08/06/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 279 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE BEST MARINER 9 PHOTOGRAPHY ON MICROFICHE FROM THE IPL/RDR. THE FIRST CARD CONTAINS EXPLANATIONS OF DATA FOR THIS MICROFICHE CATALOG. THE QUALITY OF REPRODUCTION IS SUFFICIENT FOR SOME SCIENTIFIC STUDIES TO BE MADE DIRECTLY FROM THEM.

DATA SET NAME- SEOR FINAL SUPPORT DATA ON MAGNETIC TAPE NSSDC ID 71-051A-04K

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/12/71 TO 10/18/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE FINAL AND MOST CORRECT SUPPORT DATA TAPE FOR THE MARINER 9 PHOTOGRAPHY. THE TAPE WAS WRITTEN IN 7-TRACK BINARY CODE AT 556 BPI ON AN IBM 360. THE CONTENTS OF THE TAPE SUPERSEDE ANY OTHER SUPPORT DATA, SUCH AS THE RECORDS ON THE DATA BLOCKS ON THE IMAGERY, OR THOSE ON THE REDUCED DATA RECORDS (PDR). THE INFORMATION GIVEN IS SIMILAR TO THAT CONTAINED IN DATA SET 71-051A-04H.

DATA SET NAME- CATALOG OF MARINER 9 MTVS PHOTOGRAPHY NSSDC ID 71-051A-04L  
ON 16-MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/09/71 TO 10/31/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 20 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE COMPLETE MARINER 9 MTVS PHOTOGRAPHY ON 16-MM FILM FOR CATALOG PURPOSES. GENERALLY, THREE RENDITIONS OF EACH FRAME ARE GIVEN -- (A) RAW, (B) ALBEDO RECTIFIED, AND (C) HIGH PASS FILTERED (FOR MAXIMUM DISCRIMINATION). THE QUALITY IS VERY GOOD, AND THE PHOTOS CAN BE DIRECTLY USED FOR SOME SCIENTIFIC PURPOSES.

DATA SET NAME- MOSAIC PHOTOGRAPHS AND INDEX CATALOG ON NSSDC ID 71-051A-04N  
16 MM MICROFILM

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/13/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MICROFILM

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF JPL PREPARED MOSAIC BOARDS OF SELECTED AREAS OF THE MARTIAN TERRAIN TOGETHER WITH AN INDEX ON 16-MM MICROFILM. THE PHOTOGRAPHIC MOSAICS ARE GROUPED ACCORDING TO SPECIFIC GEOGRAPHICAL AREAS AND WERE FILMED FROM 4-X 5-IN NEGATIVES (DATA SET 71-051A-04G). THE INDEX CONSISTS OF TWO LISTINGS WHICH ARE IDENTICAL IN CONTENT. THE FIRST IS ORDERED BY MOSAIC NUMBER AND THE SECOND BY DAS TIME. THIS MOSAIC CATALOG ENABLES USERS TO IDENTIFY THOSE MOSAICS FOR WHICH THEY REQUIRE HIGHER QUALITY REPRODUCTIONS.

DATA SET NAME- LIMB PHOTOGRAPHY INDEX ON B/W MICROFICHE NSSDC ID 71-051A-040

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 16 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET BY JPL CONSISTS OF B/W POSITIVE MICROFICHE CARDS, INDEXING THE COMPLETE SET OF LIMB PHOTOGRAPHY FROM THE MARINER 9 IPL REDUCED DATA FOUND IN DATA SET 71-051A-04P. EACH FRAME CONTAINS THE SUPPORT DATA THAT ALL MARINER 9 PHOTOGRAPHY POSSESSES. THE LISTINGS ARE ORDERED BY IPL ROLL NUMBER, AND SEDR/DAS TIME.

DATA SET NAME- LIMB PHOTOGRAPHY CATALOG ON B/W  
MICROFICHE

NSSDC ID 71-051A-04P

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 166 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF JPL MICROFICHE OF THE MARTIAN LIMB PHOTOGRAPHY. IN ADDITION TO THE PHOTOGRAPHIC IMAGERY, THERE ARE PLOTS OF LIMB PROFILES, SUPPORTING DATA BLOCKS FOR THE PHOTOGRAPHS, AND SUPPORTING DATA FOR THE PLOTS. THE DATA BLOCKS FOR THE PHOTOGRAPHY CONTAIN THE FOLLOWING INFORMATION -- PICTURE NUMBER, DAS TIME, ALTITUDE, VIEW ZENITH ANGLE, CENTER AND CORNER COORDINATES, YEAR, DAY, MONTH, GMT TIME, FILTER, PICTURE HEIGHT AND WIDTH IN KM ON THE SURFACE, PHASE ANGLE, PROCESS DATA, AND IPL NUMBER. THE DATA BLOCKS ON THE LIMB PROFILE PLOTS CONTAIN THE FOLLOWING INFORMATION -- DAS TIME, FILTER, LIMB ABSCISSA, PLOT LINE NUMBER, LOCAL TIME, LONGITUDE AND LATITUDE, LINE SAMPLE, ILLUMINATION ANGLE, PHASE ANGLE, SUN AZIMUTH, SCALE, START LINE, START SAMPLE, END LINE, AND END SAMPLE. THE IMAGERY IS GENERALLY VERY GOOD, INCLUDING THE PLOTS AND THE DATA BLOCKS. OCCASIONALLY SOME OF THE LETTERS BLEED A LITTLE IN THE DATA BLOCKS, BUT EVEN THESE SHOULD BE LEGIBLE.

DATA SET NAME- SELECTED MTVS AND IPL PHOTOGRAPHY ON  
MICROFICHE FROM CAL TECH

NSSDC ID 71-051A-04Q

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/12/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 467 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF NEGATIVE MICROFICHE, SELECTED BY CAL TECH PERSONNEL REPRESENTING THE BEST FRAMES FROM THE MTVS AND IPL REPRODUCTIONS. MOST OF THE PHOTOGRAPHS ARE THE ALBEDO-STRETCHED AND MAXIMUM-DISCRIMINATION VERSIONS OF THE ORIGINAL IMAGERY. INCLUDED WITH THE PHOTOGRAPHS ARE GRAY SCALES, QUADRANT MAPS, AND SUPPORTING DATA FOR THE IMAGES THAT APPEAR ON EACH CARD. THE SUPPORTING DATA CONTAIN THE FOLLOWING INFORMATION -- PICTURE IDENTIFICATION, DAS TIME, ORBIT NUMBER, CAMERA, FILTER, ROLL AND FILE NUMBER

(MTVS), DATA PICTURES FOOTPRINTS (MAPS), CORNER COORDINATES, SLANT RANGE, VIEWING ANGLE, RESOLUTION, SOLAR LIGHTING ANGLE, PHASE ANGLE, LOCAL TIME OF THE CENTER FROM MIDNIGHT, SUN DIRECTION IN THE IMAGE, DIRECTION OF NORTH IN THE IMAGE, AND EXPOSURE INTERVAL. THE TIME PERIOD COVERED IS FROM NOVEMBER 12, 1971 (FAR-ENCOUNTER PHOTOS), TO OCTOBER 27, 1972. SOME OF THE SUPPORTING DATA BLOCKS ARE ALMOST ILLEGIBLE, AND WILL BE VERY HARD TO REPRODUCE, ESPECIALLY SINCE THEY ARE POSITIVE ON THE CARDS IN WHICH THE IMAGERY IS NEGATIVE, AND WILL THEREFORE REPRODUCE WHITE ON BLACK. THE SUPPORTING DATA IN THESE CARDS ARE EQUIVALENT TO THE SEDR DATA, WHICH IS THEREFORE THE MOST CORRECT. THE PHOTOGRAPHIC IMAGERY IS GENERALLY VERY GOOD. THE FOOTPRINT AND SUPPORTING DATA IMAGERY VARY FROM FAIR TO POOR. THESE MICROFICHE ARE FOR CATALOG PURPOSES, BUT THE IMAGERY MAY BE USEFUL IN SOME AREAS OF RESEARCH.

DATA SET NAME- PICTURE AND ENHANCEMENT CATALOG ON  
MAGNETIC TAPE

NSSDC ID 71-051A-04T

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 1 REEL(S) OF MAGNETIC TAPE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF A MAGNETIC TAPE OF THE PICTURE AND ENHANCEMENT CATALOG FOR MARINER MARS 71. THE TAPE IS 556 BPI, BINARY, 7 TRACK, AND CREATED ON AN IBM 360 COMPUTER. EACH RECORD ON THE TAPE IS DIVIDED INTO THREE SECTIONS. SECTION 1, LEVEL 1 OCCURS ONE TIME FOR EACH PICTURE. TWO OF THE FIELDS IT CONTAINS, PL COUNT (IMAGE PROCESSING LABORATORY COUNT) AND MTV COUNT (MARINER 71 TV-PICTURE COUNT), REFLECT THE NUMBER OF ENTRIES IN THE OTHER TWO SECTIONS. SEGMENT 2, LEVEL 2 CONTAINS ENTRIES WHICH REFLECT THE NUMBER AND TYPE OF PROCESSING OF A PICTURE BY THE IMAGE PROCESSING LABORATORY. SEGMENT 3, LEVEL 2 CONTAINS ENTRIES WHICH REFLECT THE NUMBER AND TYPE OF MTVS FRAMES ON WHICH A PICTURE EXISTS (USUALLY THREE OR FOUR).

DATA SET NAME- MARINER 9 JPL MOSAIC CATALOG AND INDEX ON  
MICROFICHE

AVAILABILITY OF DATA SET- DATA AT NSSDC

TIME PERIOD COVERED- 11/14/71 TO 10/27/72 (AS VERIFIED BY NSSDC)

QUANTITY OF DATA IN THIS DATA SET- 7 CARDS OF B/W MICROFICHE

DATA SET BRIEF DESCRIPTION

THIS DATA SET CONSISTS OF THE JPL MOSAICS PHOTOGRAPHY AND THE INDEX TO THIS PHOTOGRAPHY THAT HAVE BEEN REPRODUCED ON MICROFICHE AT NSSDC FOR CATALOG PURPOSES. THIS DATA SET IS THE MICROFICHE VERSION OF MICROFILM DATA SET 71-051A-04N.

# NSSDC DATA REQUEST FORM\*

<b>Scientists OUTSIDE the United States send order to:</b>  WORLD DATA CENTER A ROCKETS AND SATELLITES CODE 601 GODDARD SPACE FLIGHT CENTER GREENBELT, MARYLAND 20771, USA		<b>Requesters WITHIN the United States send order to:</b>  NATIONAL SPACE SCIENCE DATA CENTER CODE 601.4 GODDARD SPACE FLIGHT CENTER GREENBELT, MARYLAND 20771	
<b>REQUESTER INFORMATION (Please print)</b>			
NAME		TITLE/POSITION	
DIVISION/BRANCH/DEPARTMENT			MAIL CODE
ORGANIZATION			
ADDRESS			
CITY		STATE	
ZIP CODE OR COUNTRY		TELEPHONE (Area Code) (Number) (Extension)	
DATE OF REQUEST	DATE DATA DESIRED	(Our average processing time for a request is 3 to 4 weeks. Please allow ample time for delivery. We will notify you if we cannot meet the date specified.)	

## INTENDED USE OF DATA (check all that apply)

<input type="checkbox"/> Support of a NASA effort (project, study, etc.); Contract No. _____ <input type="checkbox"/> Support of a U.S. Government effort (other than NASA) <input type="checkbox"/> Research and analysis project (individual or company sponsored) <input type="checkbox"/> Educational purposes (explain below) <input type="checkbox"/> Preparation of Master's thesis <input type="checkbox"/> Preparation of Doctoral thesis <input type="checkbox"/> Other: _____ _____ _____ _____	<input type="checkbox"/> Exhibit or display <input type="checkbox"/> Reference material <input type="checkbox"/> Use in publication
<p>NSSDC requests the submission of all publications resulting from studies in which data supplied by NSSDC have been used. Please state briefly the research projects in which you are engaged and if you plan to prepare any articles based on this research.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	

\*NSSDC has available special forms for ordering photographic data from the Surveyor, Lunar Orbiter, Apollo, and Mariner missions. These forms will be provided on request.

# NSSDC CHARGE AND SERVICE POLICY

The purpose of the National Space Science Data Center (NSSDC) is to provide data and information from space science flight experiments in support of additional studies beyond those performed by the principal investigators. Therefore, NSSDC will provide data and information upon request to any individual or organization resident in the United States. In addition, the same services are available to scientists outside the United States through the World Data Center A (WDC-A) for Rockets and Satellites. (The addresses for both NSSDC and WDC-A are given on the reverse side.) Normally, a charge is made for the requested data to cover the cost of reproduction and the processing of the request. The requester will be notified of the cost, and payment must be received prior to processing the request. However, the Director of NSSDC may waive, as resources permit, the charge for modest amounts of data when they are to be used for scientific studies or for specific educational purposes and when they are requested by an individual affiliated with: (1) NASA installations, NASA contractors, or NASA grantees; (2) other U.S. Government agencies, their contractors, or their grantees; (3) universities or colleges; (4) state and local governments; and (5) non-profit organizations.

## DATA REQUESTED

NSSDC DATA SET ID NUMBER	Spacecraft, Experiment, and Data Set Names	Form of Data* (e.g., 16mm microfilm) Refer to data set brief descriptions.	Timespan Needed

## Additional Specifications

\*If requesting data on magnetic tape, please supply the necessary information below.

Density  
☐ 556 bpi  
☐ 800 bpi  
☐ 1600 bpi

Mode  
☐ BIN  
☐ BCD

No. of Tracks  
☐ 7  
☐ 9

Computer  
\_\_\_\_\_

- ☐ New tapes will be supplied prior to processing.  
☐ Original NSSDC tapes will be returned.  
☐ I shall pay for new tapes.